

OCTOBER 1959



CHEMICAL PROCESSING

Lignosol disassociates the word 'waste' from
sulfite liquor, spray dries 140 lb/min . . . 32

Chemical distributors help producers to cut
costs of sales and distribution 24

. . . also more than 275 terse reports
on new processing techniques, chemicals,
instruments, equipment 6

TODAY INSIDE WESTERN EUROPE'S CPI . . .

Euro-report Reveal: What's Happening in...

---arch--- hnology---Comm Market---Jo

Exclusive, On-The-Spot

EURO-REPORT

- COMMON MARKET
- JOINT VENTURES
- RESEARCH
- TECHNOLOGY

Page 28

ne ertheless -

other side of the

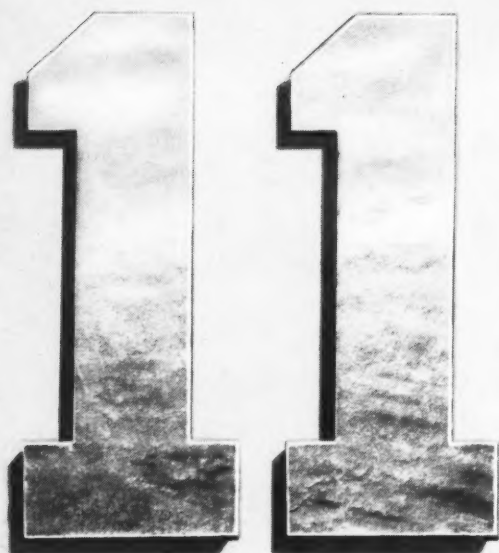
ultimately may result in a thoroughly un

As one Frenchman, who is a firm belie

Europe, said:

\$1.00 the copy

A PUTMAN PUBLICATION
"Executive Magazines for Industry"



B & A[®]

METALLIC NITRATES

Aluminum

Barium

Cadmium

Chromium

Cupric

Ferric

Lead

Magnesium

Manganous

Mercuric

Nickelous

Which ones can serve your needs best?

If you use metallic nitrates, chances are one or more of those listed here will meet your needs. And, if that's the case, you'll find Baker & Adamson[®] is your *best* source of supply. Here's why:

Highest Purity!

B&A Metallic Nitrates have long set industry standards for highest purity and quality. They are available in purified or technical grades for general manufacturing use . . . in reagent grade for more exacting requirements.

Dependable, basic source!

Baker & Adamson is the *only* producer of metallic nitrates with its own nitric acid production facilities. This is your best assurance of continuous, dependable supply!

Continuous production from 2 plants!

B&A Metallic Nitrates are shipped

from two producing locations—Buffalo, New York and Marcus Hook, Pennsylvania. Metallic nitrate solutions are shipped in tank cars or tank trucks . . . crystals come to you in lightweight polyethylene-lined drums.

A complete line!

B&A offers a complete line of metallic nitrates, including those custom-made to your requirements for special applications. We will be glad to show you how leading companies in many chemical processing fields are avoiding problems and saving capital investment by depending on B&A's established production facilities rather than manufacturing their own metallic nitrates.

Want further information?

Write today for technical data on the B&A Metallic Nitrates that interest you—also samples and prices.

BAKER & ADAMSON[®]
Fine Chemicals

**Allied
Chemical**

GENERAL CHEMICAL DIVISION

40 Rector Street, New York 6, N. Y.

Check 1000 opposite last page.



**conventions
and exhibits**

October 4-7. Society of Petroleum Engineers of AIME, Fall Meeting, Dallas.

October 5-7. Packaging Specifications Conference, Purdue University, Lafayette, Indiana.

October 5-8. National Association of Corrosion Engineers, Northeast Region Conference, Lord Baltimore Hotel, Baltimore, Md.

October 8-10. American Association of Textile Chemist and Colorists, Sheraton Park and Shoreham Hotels, Washington, D. C.

October 12-14. National Electronics Conference, Sherman Hotel, Chicago, Ill.

October 13-14. Society of Plastics Engineers, Southern California Section, Ambassador Hotel, Los Angeles.

October 16-17. 4th E. P. Schoch Lectures, Batts Hall Auditorium, University of Texas, Austin, Texas.

October 19-23. National Safety Congress and Exposition, Conrad Hilton, Sheraton, Congress, Morrison and LaSalle Hotels, Chicago, Ill.

October 20. Chemical Institute of Canada, Panel Discussion: "The Canadian Chemical Industry-Selling: What Does It Cost?", Toronto, Canada.

October 20-24. Federation of Paint and Varnish Production Clubs, 37th Annual Meeting and the 24th Paint Industries' Show, Convention Hall, Atlantic City, New Jersey.

October 22-24. Acoustical Society of America, Cavitation, Cleveland, Ohio.

October 26-28. Chemical Institute of Canada, 9th Canadian High Polymer Forum, Guild Inn, Toronto, Canada.

November 2-4. Atom Industrial Forum & American Nuclear Society, Coordi-

... Meetings and shows of interest to the chemical industries

nated Conference, Sheraton-Park Hotel, Washington, D. C.

November 2-5. 11th Exposition of the Air-Conditioning and Refrigeration Industry, Convention Hall, Atlantic City, New Jersey.

November 2-5. The Metallurgical Society of AIME, Morrison Hotel, Chicago, Illinois.

November 2-6. 41st National Metal Exposition & Congress, International Amphitheatre, Chicago, Illinois.

November 4-6. American Nuclear Society Winter Meeting, Sheraton-Park Hotel, Washington, D.C.

November 5-6. Industrial Management Society, 23rd Annual National Industrial Engineering and Management Clinic, Conrad Hilton, Chicago.

November 9-11. American Petroleum Institute, 39th Annual Meeting, Conrad Hilton, Palmer House, Congress Hotels, Chicago, Ill.

November 16-18. 21st Annual National Packaging Forum of the Packaging Institute, Statler-Hilton Hotel, New York City.

November 24. Manufacturing Chemists' Association, 9th Semiannual Midwinter Meeting, Hotel Statler, New York City.

November 30-December 4. 1959 Exposition of Chemical Industry, Coliseum, New York City.

December 6-10. American Institute of Chemical Engineers, Annual Meeting, Sheraton Palace Hotel, San Francisco.

December 7-9. Chemical Specialties Manufacturers Association, 46th Annual Meeting, Mayflower Hotel, Washington, D.C.

modernize your bulk handling facilities

with Dracco Airstream Conveyors

Modernized bulk materials handling offers the greatest potential for cost reduction and increased productivity. Dracco Airstream Conveyors handle literally hundreds of dry, bulk materials—from coal to corn flakes—and provide these cost-saving benefits:

LOWER LABOR COSTS with automatic operation and one-man supervision . . . no costly manual handling . . . no extra or unnecessary handling steps.

LOWER MATERIAL COSTS through bulk purchasing . . . no loss from spillage or broken bags . . . no spoilage from moisture or contamination.

LOWER MAINTENANCE COSTS through sound engineering, simple design and rugged construction . . . minimum repair and lubrication requirements . . . reliable long-term operation.

UNLIMITED FLEXIBILITY since space-saving systems adapt to new or existing plants . . . conveying lines can be located anywhere . . . no costly auxiliary handling methods needed.

CLEANER PLANTS since Airstream Systems are completely enclosed and dust-free.

GREATER SAFETY with no hazardous moving parts . . . no workmen exposed to toxic materials.

IMPROVED PRODUCT QUALITY from accurate batching and weighing . . . no intermixing of materials . . . no contaminating dusts.

CLOSE INTEGRATION WITH PRODUCTION with centralized, automatic control . . . processes tied into one coordinated operation with no waste motion.

For expert consultation on the modern answer to your bulk handling problem, call in a Dracco engineer today.

DRACCO DIVISION OF
FULLER CO.
4070 East 116th Street • Cleveland 5, Ohio

DRACCO

airstream conveyors
dust control equipment

(Pronounced
Dray-co)

Check 1001 opposite last page.

PACKAGED AIR HEATERS by THERMAL

Extreme compactness, high efficiency and versatility of operation are the chief characteristics of the THERMAL Type CA direct fired air heater. Designed around the high velocity THERMAL burner, it normally requires no refractory, since combustion is limited almost entirely to the burner itself. Adding to its versatility, the CA air heater performs equally well on gas, oil or combination firing and can be adapted to all pressure levels.

Type



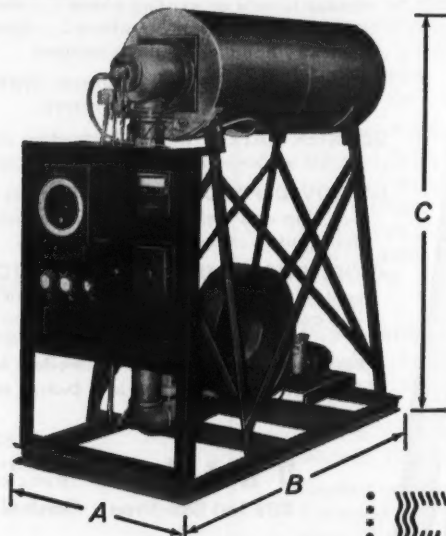
direct
fired

Type CA air heaters are most frequently sold as "packaged" units complete with all necessary safety and control apparatus. These units will provide outputs ranging from 200,000 BTU/hr to better than 30,000,000 BTU/hr and at temperatures from 300F to 1500F or higher.

TYPICAL SIZES . . .

Listed below are the overall dimensions of a few of the dozens of output, temperature, and flow combinations possible in these heaters. Figures are for atmospheric pressure units. Higher pressure heaters would be smaller.

BTU/hr	AIR FLOW scfm	TEMP. IN °F	TEMP. OUT °F	A ft.	B ft.	C ft.
800,000	1,000	60	750 F	2½	4½	4
2,500,000	5,000	60	500 F	4	7	6
4,000,000	16,000	700	900 F	7	11	8
10,000,000	8,500	60	1,000 F	5½	10	8
15,000,000	10,000	60	1,200 F	6	12	8



Write for Bulletin #112

THERMAL

Thermal Research & Engineering Corp.

CONSHOHOCKEN • PENNSYLVANIA

REPRESENTATIVES IN PRINCIPAL CITIES



Other Thermal Products
& Services:
• Gas, Oil & Combination
Burners
• Heat Exchangers
• Gas Generators
• Submerged Combustion
• Combustion & Heat
Transfer Equipment

Check 1002 opposite last page.

CHEMICAL PROCESSING

with which is combined
CHEMICAL PROCESSING PREVIEW
and Chemical Business

For the management team

More than 50,000 copies of this issue

Vol. 22

October 1959

No. 10

©Putman Publishing Company 1959

Published Monthly by

PUTMAN PUBLISHING COMPANY

111 EAST DELAWARE PLACE

CHICAGO 11, ILLINOIS

TELEPHONE: WHITEHALL 4-6141

also publishers of FOOD PROCESSING, FOOD BUSINESS,
PLANT and POWER SERVICES ENGINEER

Russell L. Putman

Ewing W. Graham

Nathaniel Beck, Jr.

Kenneth S. Kaull

George W. N. Riddle

Roy G. Helsing

James C. Budd

Thomas J. Scanlon

Robert C. McKay

President and Publisher

Vice President and Treasurer

Vice President

Vice President

Vice President — Research

Production Manager

Assistant Production Manager

Director of Circulation

Circulation Manager

Editorial Staff—page 6

Advertising Representatives—page 209

CHEMICAL PROCESSING serves members of the Management Team in these industries:

Basic Chemical and Chemical Processing Industries

Industrial inorganic & organic chemicals (acids, alkalis, plastics, synthetic fibers, explosives, etc.)
Drugs & medicines
Soap & cleansing products
Paints, varnishes, lacquers
Gum & wood chemicals (Naval stores)
Fertilizers

Animal & vegetable oils & fats
Miscellaneous chemicals (cosmetics & toiletries, inks, insecticides, water treatment chemicals, etc.)
Paper & allied products
Petroleum, coal, coke-oven products
Rubber products
Stone, clay & glass products
Atomic energy establishments

Other Industries Utilizing Chemicals or Chemical Processes

Food and allied products
Textile dyeing & finishing
Leather tanning & finishing
Metal & alloys
Machinery & equipment

Allied products (tobacco, photographic film, instruments, fabricated plastic products, etc.)
Water treating & purification plants
Government (including ordnance, missiles, etc.)

Specialized Services to the Chemical Processing Field

Plant construction consulting firms
Independent research & testing laboratories

Manufacturers of specialized chemical equipment

Subscriptions

QUALIFIED-READER SUBSCRIPTIONS are accepted from selected management and technical key men in the chemical industries without charge. To apply for a qualified-reader subscription fill in and mail the request-qualification form opposite last page.

OTHER SUBSCRIPTIONS — from "non-qualified" persons (those who are not key processing men in the chemical industries) — are accepted at \$1.00 the copy, or \$10.00 the year. Foreign subscriptions — subscriptions from countries outside the territory of the United States and its possessions are acceptable at \$35.00 per year. Such subscriptions are not counted as "industry circulation" on BPA audit reports.

Accepted as Controlled Circulation publication at Mendota, Illinois. Publication office: 1501 W. Washington Road, Mendota, Illinois. Address all correspondence to Editorial and Executive office, 111 East Delaware Place, Chicago 11, Illinois.

Member

National Business Publications, Inc.
BUSINESS PUBLICATIONS AUDIT
of Circulation, Inc.



CHEMICAL PROCESSING



over the editor's
shoulder



Covering the bases

Specialization has become as much a part of the American scene as the hot dog or the ice cream cone.

The fellow who once was the jack-of-all-trades seems virtually passe. Instead, we have the market analyst, the cost analyst, the time study engineer, to name a few. Each does a certain, specialized job.

But CHEMICAL PROCESSING refutes the theory of specializing in one particular phase of the industry it serves. It covers the entire chemical processing field, consisting of 16 to 18 different industries.

There are timely and provocative articles to keep management men abreast of events in their spheres, such as a discussion on businessmen in politics, page 26, and how to maintain good morale, on page 23.

Process men, too, will find subjects of vital interest concerning management problems as well as information on how they can perform their duties better, more efficiently, more economically.

Up-to-the-minute data on chemical materials and chemical processing equipment awaits the attention of the many engineers charged with the responsibility of making decisions relative to such things. And other engineers are shown how to cut costs and time in handling and packaging products.

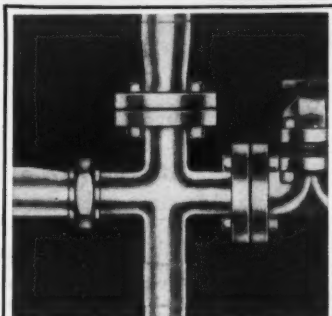
Sure, specialization is important. But we place our emphasis on presenting a variety of articles on various phases of CPI which are calculated to have the greatest interest for the greatest number of readers.

Paul Hoffman

News Editor



SPEEDLINE'S EXTRA LENGTH FEATURE GAVE US MORE PIPE PER FITTING DOLLAR



Flange where you want to, weld where you want to... any type joint can be used with any Speedline fitting. The longer straight section provides ample clearance that simplifies installation and permits easier hook-up of valves, flanges, etc. even in confined areas. The extra length feature is common to all Speedline Ells, Tees, Crosses, Reducers and Bends.

SEE DISTRIBUTOR LISTING PAGE 593 IN
CHEMICAL ENGINEERING CATALOG.

Extra length on *every* end of *every* Speedline corrosion resistant fitting adds up to *real* savings in pipe costs, compared to systems using conventional fittings (see table).

Time and labor costs are also reduced from preliminary design to finished installation. Design detailing is minimized because any type joint can be used on any—or *all*—ends of a Speedline fitting. Speedline's longer length gives more clearance for welding and faster, *easier* pipe aligning... permits flanging *without* welding by a simple rolling-in operation! And because Speedline fittings are specially designed for use with low cost, light wall stainless pipe, material costs are substantially lower from the start.

Specify Speedline for your process lines—first in the industry to offer *extra* length for *greater* economy. Write for *free* catalog.

SPEEDLINE'S EXTRA PIPE LENGTH BONUS

I.P.S. SIZE	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
90° Elbow	2 1/2"	3"	2 3/4"	2 1/2"	2 1/2"	3"	2 1/2"	4"	4 1/2"
45° Elbow	2 1/2"	3"	2 3/4"	2 1/2"	2 1/2"	3"	2 1/2"	4"	4 1/2"
Tee	4 1/8"	4 1/2"	4 1/8"	3 3/4"	3 3/8"	4 1/2"	4 1/8"	4 7/8"	4 7/8"
Cross	5 1/2"	6"	5 1/2"	5"	4 1/2"	6"	6 1/2"	6 1/2"	6 1/2"

With 100-2" Speedline elbows you get 25' more pipe than with conventional fittings. How do these pipe savings add up for your requirements?

Speedline

© REG. T.M. OF HORACE T. POTTS COMPANY

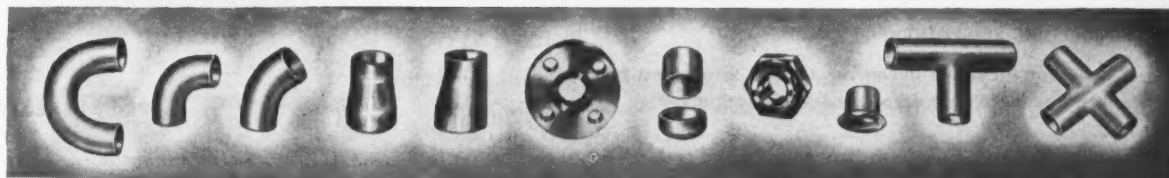
CORROSION-RESISTANT FITTINGS

STAINLESS STEEL
SCHEDULES 5 AND 10

ALUMINUM
SCHEDULES 10 AND 40

HASTELLOY, TITANIUM AND OTHER ALLOYS ON APPLICATION

901-R1



Manufactured by HORACE T. POTTS COMPANY • 502 E. Erie Ave., Philadelphia 34, Pa.

Check 1003 opposite last page.

highlights

CHEMICAL BUSINESS

How Are Your Employee Relations? — W. L. Stabler	23
Chemical Distributor Plays Key Role — F. D. Hildebrandt	24
Leadership of Businessmen Needed in Politics	26
EXCLUSIVE: On-the-spot Euro-report — J. C. Vaaler	28

NEW PROCESSING TECHNIQUES, MATERIALS and EQUIPMENT

NEW SOLUTIONS OF PROCESSING PROBLEMS

Castable withstands temperatures from 100 to 2700°F	31
Spray-dries 140 lb/min of sulfite liquors	32
Union Carbide finds many uses for silica insulation	33
Pulp mill halts air pollution, recovers 75 tpd salt cake	34
Low pressure drop — reason for valve selection	42

CHEMICAL MATERIALS

New challenges for molybdenum and tungsten chemistry	55
Chemical uses for ultra-pure liquid hydrogen	64

IDEAS

Continuously dries aspirin in two minutes	75
Removes 60% of hydrogen from steel in ladle	80

PROCESS INSTRUMENTATION & LABORATORY APPARATUS

Waste-treatment controls cut chemical costs sharply	83
Hydraulic load-cell system proves care-free	90

CORROSION CONTROL

No maintenance in four years with zinc-vinyl coating	101
Chlorination can't hurt rubber-lined equipment	106

U. S. and WORLD PETROCHEMICALS

Fin-tube exchangers reduce tower costs	116
Fermosa fertilizer plant dries hydrogen continuously	122

MATERIAL HANDLING & PACKAGING

Solves problem of conveying hygroscopic additives	126
Polyethylene bags bar moisture from ammonium nitrate	130

PROCESSING EQUIPMENT

Superheated steam pulverizes 12,000 lb alumina per hr	141
Agitator in conical dryer speeds operation	144

PLANT ENGINEERING, MAINTENANCE & SAFETY

Rubber-sleeve vacuum valve empties bins automatically	151
Causes of cavitation problems in centrifugal pumps	158

**CHEMICAL
PROCESSING**

OCTOBER 1959

VOLUME 22 • NUMBER 10

THE STAFF

Editor

John C. Vaaler

Petrochemical Editor
Gordon Weyermuller

Associate Editors
Ted F. Meinhold
Theodore W. Wett

Consulting Editor
D. S. Davis

Managing Editor
Dana B. Berg

News Editor
Paul Hoffman

Assistant Editors
George Bangs
Jay Gossett

Editor East

John B. Mellecker

Editor West

Karl Robe

Washington News
Joan Marziotti

Editorial Production

Joann Schmitt
Jane DeChant

Art Director

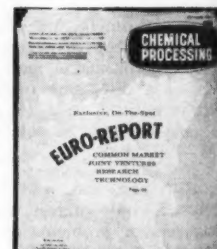
Ralph C. Donges

Editorial Assistants

Lucille Miller
Helen Bautista
Chris Pancerz
Barbara Sumner

THIS MONTH'S COVER

A comprehensive, on-the-spot report detailing what's happening in Western Europe's chemical processing industry begins on page 28. It's the first of a two-part "Euro-report" written by Editor John C. Vaaler as the result of a tour this summer through Germany, Holland, Italy, and France in which he interviewed top CPI figures and visited numerous processing plants. It's factual, up-to-date, informative. Be sure to watch for next month's installment.



REGULAR FEATURES

Conventions & Exhibits	2	Nuclear Notes	20
Spotlight on People	7	Engineering Data	47
Watching Washington	9	Recent Books	172
Letters from Readers	12	New Literature	186
Our Growing Industry	15	Advertisers Index	207

SPECIAL READER SERVICES

• For more information on articles and advertisements in this issue, check the Reader Service slip opposite last page

• To subscribe to this magazine see reader-qualification form opposite last page



Spotlight On People

Organization of three new companies by Celanese Corporation of America has resulted in several important personnel appointments. RICHARD W. KIXMILLER becomes president both of Celanese Chemical Co. and Celanese Plastics Co., and JOHN W. BROOKS is named president of Celanese Fibers Co. In addition, both continue as vice presidents of Celanese Corporation of America, of which Mr. Kix-Miller also continues as a director. JOHN H. WORTH is appointed vice president of Celanese Chemical and WILLIAM P. ORR is named vice president of Celanese Plastics.

Spencer Chemical Company has a new portfolio of officers. They are: KENNETH A. SPENCER, formerly president, elected board chairman and chief executive officer; C. Y. THOMAS, formerly general vice president — operations, now vice chairman of board; JOHN C. DENTON, formerly vice president — Agricultural Chemicals Division, elected president, member of board of directors and member of the board's executive committee; JOHN P. MILLER, previously general vice president — finance, named senior vice president — finance; JOE E. CULPEPPER, formerly general vice president — marketing, now senior vice president — marketing, and BYRON M. KERN, previously general manager of production — Agricultural Chemicals, named vice president — Agricultural Chemicals.

F. DEAN HILDEBRANDT is elected an executive vice president of McKesson & Robbins, Inc.

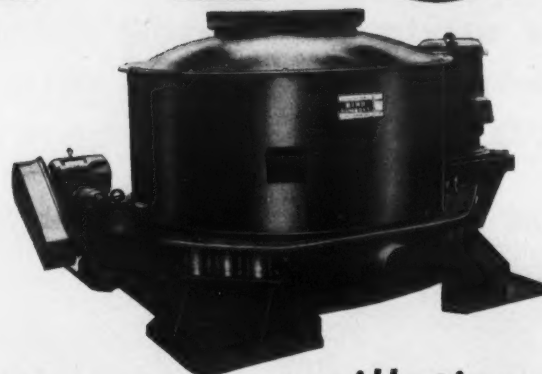
Atlas Powder Company announces election of ROGERS C. B. MORTON to the board of directors.

At Allied Chemical Corporation, JAMES G. FOX JR. is appointed president of National Aniline Division.

Virginia-Carolina Chemical Corporation announces election of CHARLES T. HARDING, executive vice president, to the board of directors. Dr. WILLIAM P. BOYER is named

LATEST

... Of The Comprehensive
Range Of Equipment Developed
For But One Purpose—To Provide
The Most Efficient And
Economical Method For Handling
Your Solid-Liquid Separations
Whatever The Materials, The
Volumes, The Process Requirements

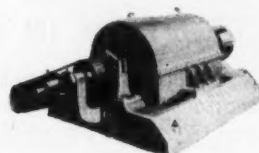


The BIRD-HUMBOLDT / oscillating screen centrifuge

Here is a new machine that may save you a lot of money on dewatering of plus 65 mesh granules or crystals. It handles from 5 to 50 or more tons per hour — gets the solids down to 5% or less surface moisture with almost no loss or degradation of solids — operates up to 3000 hours or more without screen replacement — takes only 0.2 KWH per ton of dried solids.

which
is the best
separating method
for you?

That's easy. Just put it up to the Bird Research and Development Center, a fully staffed and equipped pilot-scale testing laboratory devoted exclusively to solid-liquid separation work.



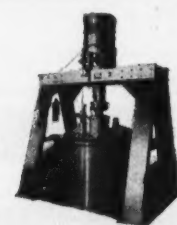
BIRD CONTINUOUS SOLID BOWL CENTRIFUGALS are widely used for a great range of applications. Solids may range from a fraction of a micron to half inch; feed slurries may vary in volume and in consistency; cost of operation and maintenance is seldom more than a few cents per ton.



BIRD-YOUNG ROTARY VACUUM FILTERS offer up to ten times the capacity per foot of filter area of ordinary vacuum filters. Their unique design assures positive, complete discharge of dry cake; ability to handle large volumes of filtrate; multi-stage, counter-current wash; fume-tight operation.



BIRD-PRAYON HORIZONTAL, PAN TYPE VACUUM FILTERS provide maximum effective cake wash with minimum wash liquor; eliminate cloth blinding troubles; high tonnage per unit of filter area which ranges from 30 to 560 sq. ft.



BIRD SUSPENDED BATCH CENTRIFUGES are for heavy duty, high capacity operation; 40" or 48" basket, perforate or imperforate; fume-tight or explosion proof construction when required.



BIRD
MACHINE COMPANY

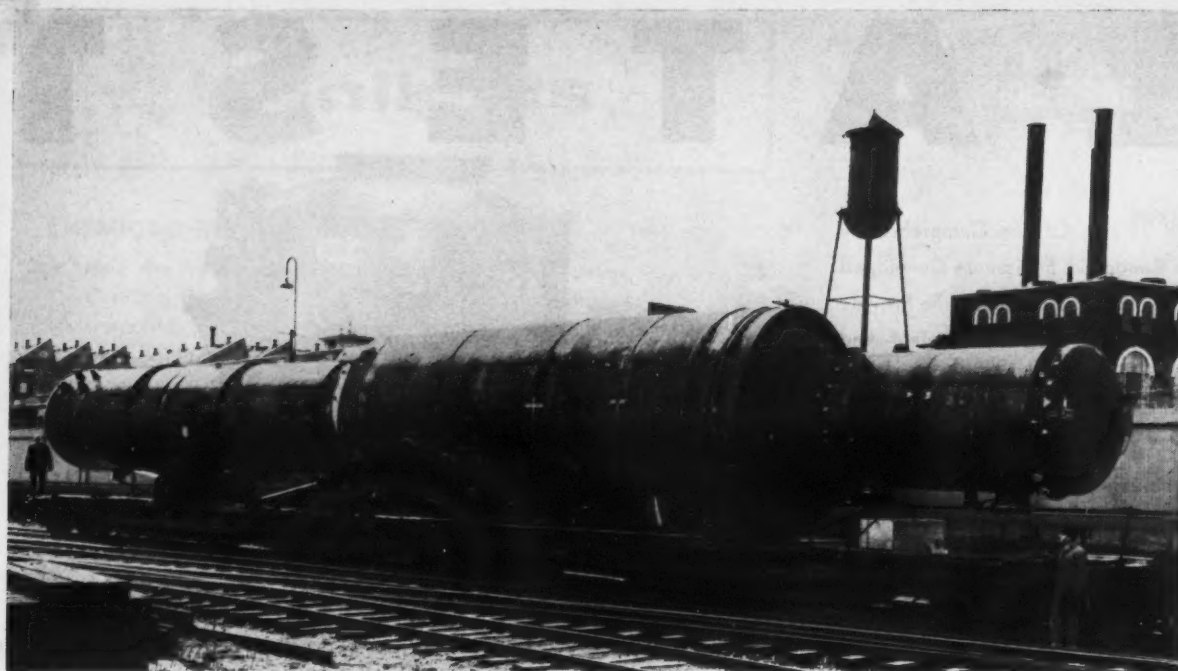
SOUTH WALPOLE, MASSACHUSETTS

Regional Offices:

EVANSTON, ILLINOIS ALAMO, CAL. ATLANTA 9, GEORGIA



Check 1004 opposite last page.

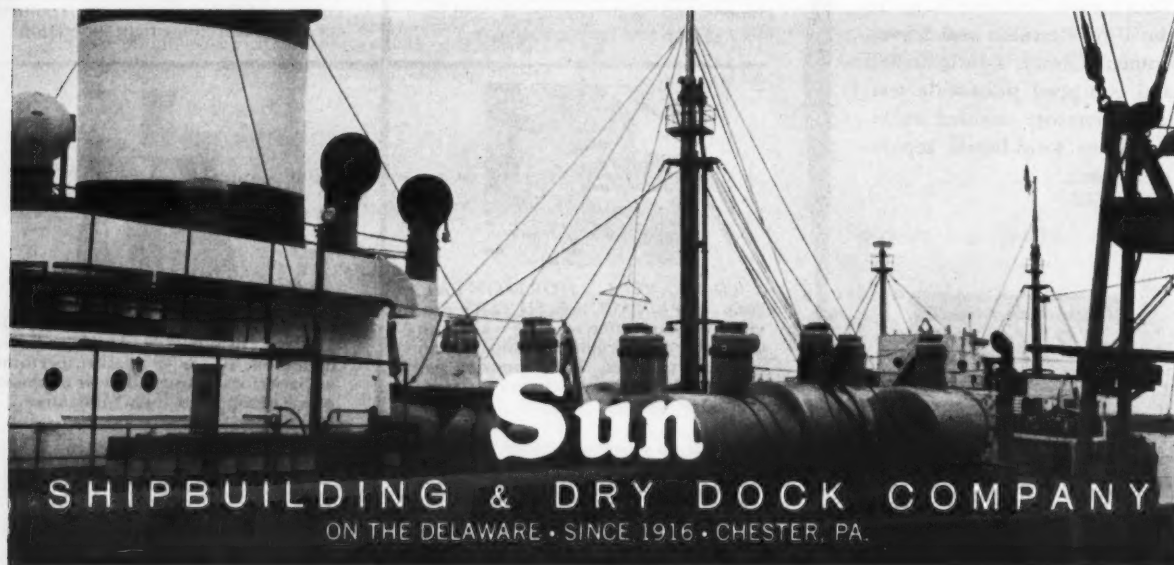


VERSATILITY

SOLVES PROBLEMS IN SHIPPING PROCEDURE

The variety of large-size work which Sun Ship's shops produce is matched by a variety of equally important shipping problems. Sun's facilities for shipping by water (overseas, coastal, or inland)—directly from our plant, are often the most economical available, and when large pressure vessels, such as those shown here, are scheduled for overseas shipment, direct, plant-to-ship loading saves additional time and expense.

Inland customers benefit from our ability to pre-check clearances and schedule shipments by rail or truck before production ever begins, so that delivery on schedule... on budget... is assured. Thus VERSATILITY... which has been made a "standard procedure" through Sun's experience... is extended through one more avenue... Shipping Procedure.



Sun

SHIPBUILDING & DRY DOCK COMPANY

ON THE DELAWARE • SINCE 1916 • CHESTER, PA.

PEOPLE

vice president, and WALLACE T. McKEEL, treasurer.

New vice presidents of Esso Standard Oil Company are ROBERT O. GOODYKOONTZ, general manager of marketing, and J. PRINCE WARNER, general manager of manufacturing.

At Enjay Company, Inc. ROBERT K. DIX is elected a vice president.

THOMAS M. WARE, International Minerals & Chemical Corporation president, is made chief executive officer.

The Chemstrand Corporation reports election of GEORGE S. HILLS as a director, and HAMILTON HADDEN JR. and ARTHUR W. LUCAS as vice presidents.

FRANKLIN E. ECK is the new vice president of sales for Berkshire Chemicals, Inc. a subsidiary of Vitro Corporation of America.

Century Chemical Corporation's board of directors has elected a three-member executive committee. It consists of THEODORE S. HODGINS, president; GEORGE T. BAYLEY, board chairman of Calkin & Bayley, Inc.; CHARLES W. B. WARDELL JR., vice chairman of Deltec Corporation.

In a top management reorganization at Cyanamid International, R. T. BOGAN, formerly marketing director, is named executive director. Simultaneously, E. G. HESSE, previously director of finance and administration, is appointed managing director.

F. M. SIMPSON is elected president of Cities Service Oil Company (Pa.). He succeeds EDWARD L. STAUFFACHER, recently elected vice president and a member of the directorate of the parent Cities Service Company.

Creation of a new Commercial Development Department at Oronite Chemical Company has resulted in appointment of DR. R. I. STIRTON as general manager of the group; DR. W. E. ELWELL as manager, market development; K. J. VAN ARNUM, manager of market research, and R. E. ECHOLS, supervisor of market development.

Check 1005 opposite last page.



Watching Washington

Public Panel Discussions Slated to Examine Income Tax Laws

You can expect a flood of tax-relief bills next session of Congress, but whether there will be final action on any of them with benefits for CPI is anybody's guess right now.

To start the ball rolling before the next session convenes, the tax-writing House Ways and Means Committee has scheduled a series of public panel discussions to examine federal income tax laws.

According to committee chairman Wilbur D. Mills (D., Ark.), these discussions constitute only a first step in a comprehensive study by the committee of the possibilities "of establishing a broader income tax base that would make it possible to meet revenue needs with lower rates of tax."

Program Outlined

The program of discussions will include:

1. "Major Objectives of and Guides for Tax Reform."
2. "Statistical Analysis of the Tax Base and National Income."

3. "Specific Features in the Computation of Taxable Income." In this category, under "Business Deductions," panelists and committeemen will review depreciation, percentage depletion, exploration and development costs, and research and development expenditures. R & D expenditures will be discussed by William Horne Jr. of Olin Mathieson Chemical Corporation. (Panelists include representatives of labor, industry, education, finance, and research groups.)

4. "The Taxable Entity." The chemical industry representative is scheduled to be Ralph Burgess of American Cyanamid Company. He will participate in the panel on "Treatment of Dividends."

5. "Special Problems in Corporate Taxation." Such categories as "Cooperatives" will be discussed here.

6. "Rates."

Panelists will be required to submit statements on their particular topics prior to dis-

cussions. Copies of statements will be made public.

Hearings are expected to run until December 4. Chairman Mills emphasized that no legislative program would be undertaken by the committee on tax revision until all interested persons have had an opportunity to express their views in these public hearings.

Individuals scheduled to appear were invited on the basis of their experience and qualifications to discuss the topic under consideration, he said.

CHEMICAL PROCESSING will cover the sessions which are of interest to CPI.

Interior seeks approval on helium conservation

Department of Interior has asked Congress for a go-ahead to carry out a long-range plan for conserving helium.

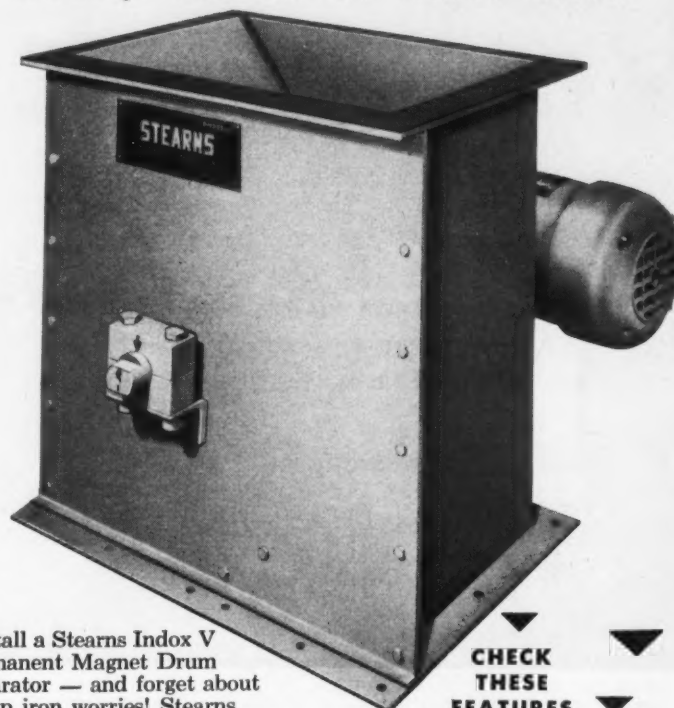
Pointing to the increasing importance of helium in the missile and atomic energy industries — and to the fact that no new sources have been discovered in this country since 1943 — Interior officials urge immediate action to build up a supply.

Predictions are that present sources of the gas will be inadequate to meet essential needs past 1980-85. Today, annual consumption is approximately 370 million cu ft — 80 times the 1937 level when helium was essentially single-purpose.

Interior's plan is to build up to 12 new plants located on natural gas pipelines. In this way, helium which now is lost when natural gas containing it is burned as fuel could be

New! STEARNS INDOX V

Drum Separator gives you
greater protection against
tramp iron... *at lower cost!*



Install a Stearns Indox V Permanent Magnet Drum Separator — and forget about tramp iron worries! Stearns engineers have developed a unit that far surpasses ordinary permanent magnet types — actually gives you up to 40 percent more magnetic strength for effective tramp iron removal.

The reason is Indox V — the amazing ceramic magnet material used by Stearns exclusively in tramp iron separation equipment.

The Stearns Indox V drum separator is ideal for process industries where materials are conveyed in enclosed chutes and spouts.

A complete line of Stearns Indox V Drum Separators is available to match most spout systems. Call your Stearns representative, or write for Bulletin No. 1051B.

CHECK THESE FEATURES

- Uniform magnetic field strength — regardless of drum width — allows higher capacity ratings, size for size.
- Very high holding power at drum surface assures positive transport of tramp iron particles.
- Factory-sealed bearings, pre-lubricated for life.
- All-stainless steel drum, hopper plate, division piece and leveling gate for maximum wear resistance.
- Optional spouting arrangements — vertical or angular.
- Direct gear-motor drive — safer, eliminates belts, chains, sprockets and guards.
- Flanged housing mounts easily in any spouting system.
- Totally enclosed, dust-protective housing — readily modified for use in air pressure systems; no large seals required on O.D. of drum.



STEARNS MAGNETIC PRODUCTS

A DIVISION OF THE INDIANA STEEL PRODUCTS COMPANY

635 SOUTH 28TH STREET

MILWAUKEE 46, WISCONSIN

Check 1006 opposite last page.

Why Illini Phosphate Company selected an H-25 PAYLOADER®



When this Champaign, Illinois fertilizer manufacturer decided to replace one of its model HA "PAYLOADER" units (that hadn't even had the engine head off in six years) it chose a model H-25 . . . but not before it had won a side-by-side competitive demonstration.

Harry Lange, foreman, summed up the reasons for their decision, "The H-25 had a lot of advantages in getting in and out of boxcars and getting around to the different fertilizer bins. The other was too slow and sluggish."

William Scott, operator, added, "The H-25 is quicker on the lift, dump and go, gets into smaller places, has more power and digs-in faster to get quick, full loads."

Want to find out what an H-25 can do in your plant? Want to see what its 2,500 lb. carry capacity, only 6-ft. turning radius, power-shift transmission (with two speeds each direction), easy power-steer, and many other advance features can do for *your* production? Ask your Hough Distributor for a demonstration.

1. Faster Operating Cycles
2. Far More Compact
3. Gets Full Loads Faster

HOUGH®

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.

744 Sunnyside Ave., Libertyville, Ill.

Send data on the H-25 "PAYLOADER"

Name

Title

Company

Street

City

State

Check 1007 opposite last page.

WASHINGTON NEWS

recovered. Thus, some 32 billion cu ft could be recovered from natural gas before it goes to market or storage.

Private industry would be invited to participate in the program. If no interest is shown, the project would proceed as government-operated.

AEC plans symposium on reactor development

The Atomic Energy Commission has called industry representatives together this month for a symposium on development and potential industrial uses of reactors for production of low-temperature process heat.

Purpose of the meeting is to present information on these reactors to industry — and to find out just how much interest industry has in participating in development of such reactors.

AEC foresees use of process heat reactors in many manufacturing industries — primary metals, glass, cement, petroleum, coal, chemical, food, and paper products.

Labeling law delayed until next session

CPI will have to wait until next year for final Congressional action on a proposed law to regulate labeling of potentially hazardous household products. Lost in a welter of "big" issues, consideration of labeling legislation got off to a late start this session.

For several years, industry groups have been working toward federal legislation, talking to the Department of Health, Education and Welfare about it — and making inevitable compromises with one another.

Both industry and the government are in agreement with a bill introduced by Senators Prescott Bush (R., Conn.) and Warren Magnuson (D., Wash.), known as S. 1283, with amendments.

FDA hopes to make industry less unhappy by having labeling coverage of foods,

drugs, and cosmetics incorporated in the bill as a separate Title II amending the Food, Drug, and Cosmetic Act. As S. 1283 now stands, there is an exemption for these categories.

Amendment puts bridle on buying Red equipment

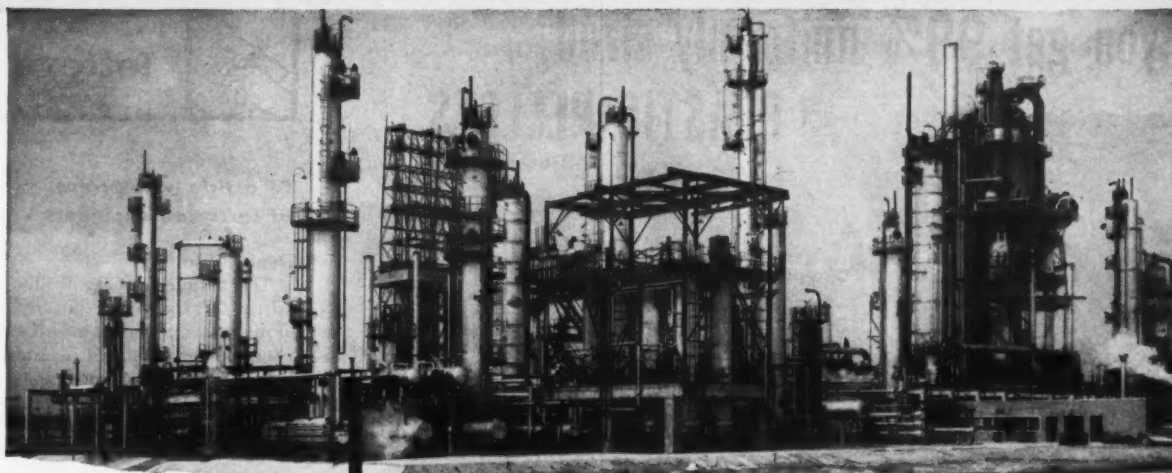
U. S. makers of educational laboratory equipment can stop worrying about Soviet "dumping." An amendment to a Health, Education and Welfare Department appropriations bill prohibits states from purchasing Russian-made laboratory apparatus and equipment with funds granted them under terms of the National Defense Education Act. Federal grants can total approximately \$70 million annually for four years—to be matched by state funds dollar for dollar. (July CP, page 11.)

Chemical and plastic products manufactured in Puerto Rico by 85 U. S. branch plants are listed in a new directory of nearly 600 "Operation Bootstrap" factories. Directory may be obtained by writing Dept. PR, Economic Development Administration of Puerto Rico, 666 Fifth Ave., New York 19, N. Y.



by G. S.

"Yeah, Fred, business is so good I can hardly stand it."



AMOCO

AMERICAN OIL COMPANY refinery at Yorktown, Virginia, cost \$35,000,000 . . . employs 350 people . . . occupies half of 1300-acre site, the remainder being available for expansion. Over 35,000 barrels of oil per day are now refined.



CONTROL ROOM of one unit of the refinery, where skilled Virginians keep watch on processes. Plant uses 142 miles of piping, electricity at voltages as high as 13,800.



3000-FOOT PIER can accommodate simultaneously a 700-ft. tanker, a 550-ft. tanker and two 250-ft. barges. Important to Amoco, also, are "unsurpassed Hampton Roads ports."

Following are a few other outstanding industries that have located in VIRGINIA

- General Electric Company
- Allied Chemical Corporation
- A-S-R Products Corporation
- The Dow Chemical Company
- Monroe Calculating Machine Company, Inc.
- Reynolds Metals Company

Let Them Tell You What Prompted Their Decisions To Locate Here.

American Oil Needed Water, Electricity, Anchorage for Tankers . . . found them all in Virginia

For its new \$35,000,000 refinery, American Oil Company needed water . . . 73,000,000 gallons a day . . . plus electricity in tremendous quantities. They needed a deep-water anchorage where tankers and

barges could unload as much as 600,000 gallons of crude oil an hour via 24-inch pipe. And they needed top rail and road transportation facilities.

They chose Virginia

More than 40 sites in a dozen states were thoroughly studied before choosing Yorktown, Virginia. Here the York River gives more than enough water to meet the refinery's big thirst and provides anchorage for the largest tankers.

An adjacent power plant built by Virginia Electric and Power Company not only provides ample electricity but also burns 600 tons of coke a day produced by the refinery. Rail and road facilities are excellent.

Extra dividends, too

In addition to unique geographic advantages, Amoco received extra dividends by locating in Virginia. Local manpower has proved unusually productive and quick to learn new skills. Transferred personnel are enthusiastic over the good living, the social, recreational and cultural advantages of Virginia. And top officials welcome the favorable business climate . . . the state's

strong leadership, lack of public debt, good economic and political attitudes. In the words of one Amoco official, "Nowhere did we find human resources to the degree that we found them in Virginia."

If you're planning a new plant, let us tell you why so many companies are locating in Virginia. Phone, wire, write . . .

C. M. Nicholson, Jr., Commissioner
DIVISION OF INDUSTRIAL DEVELOPMENT

Virginia Dept. of Conservation and Economic Development

State Office Building, Richmond, Va.
Telephone: Milton 4-4111 Ext. 2255

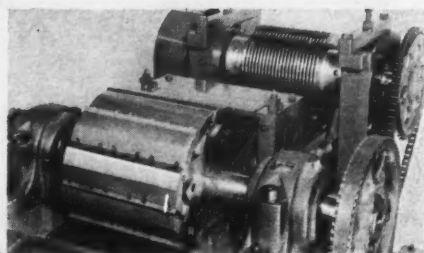
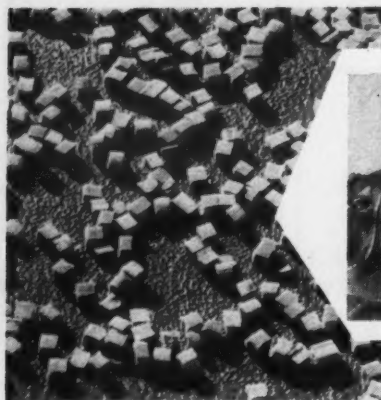
You, too, can find these... and many other great competitive advantages in

Virginia's a wonderful place to play or work. Send for Free Vacation Guide Book.

VIRGINIA

Check 1008 opposite last page.

you get 99% uniformly sized PLASTIC PELLETS



when you cut sheet or bar stock on TAYLOR-STILES PELLETIZERS

Pelletize Polyethylene, Polystyrene, nylon, vinyls, and sheet cellulose and other materials to uniform size. Providing there are no variations in thickness, and the edges of the sheet or rod stock are even, 99% of the pellets cut on a Taylor-Stiles Plastic Pelletizer will be uniform in size and shape.

Such pellets are more saleable. They make for better controlled compounding of mixes and batches. More uniform molding and extruding result.

Taylor-Stiles cutters pelletize continuous sheet or rod stock from calender or extruder at rates from several hundred pounds up to 20 tons an hour!

Available in a wide range of sizes and capacities—in several different models, which can be modified to meet special conditions.

Taylor-Stiles Pelletizers have been in actual plant operation for over 20 years. Used by the majority of America's primary producers of diced plastic and rubber stock. Their clean cutting, high production rates, low maintenance costs, ease of operation, and long knife life have earned them a reputation second to none.

Why get longs, fines and irregular shaped pellets that lead to problems in molding and extruding—when you can get 99% uniformity of pellet size with a Taylor-Stiles Pelletizer?

Write today to get all the facts about how you, too can get 99% uniform pellets, a more saleable and better running product by installing a Taylor-Stiles Pelletizer.

Mail coupon today for free folders

TAYLOR, STILES & COMPANY

20 Bridge Street
Riegelsville, N. J.

Please send me the following folders:

- ☐ Folder 217 800 Series Pelletizers (For Plastics)
- ☐ 216 700 Series Plastic Pelletizers (To cut up to 20 tons of small pellets per hour)
- ☐ 213 "Little Giant" Dicing Cutters & Pelletizers (For Plastics and Rubber)
- ☐ 202 Rubber Cutters & Pelletizers

Name.....
Company.....
Address.....
City.....State.....

Check 1009 opposite last page.



letters from readers

CP article wins praise of corrosion engineers

Dear Editor:

The article by Guy Williams (July CP, page 70) on corrosion was excellent in all respects. Does CHEMICAL PROCESSING allow any one to reprint articles from the magazine? If your policy is to allow reprinting, we would like to reprint the article for distribution among our membership.

T. J. HULL

Executive Secretary
National Association
of Corrosion Engineers
Houston, Texas

(Editor's Note: We will be glad to have you make reprints of the article by Mr. Williams and send it to the 6300 members of the National Association of Corrosion Engineers.)

Unique idea proposed to blunt Red dumping

Dear Editor:

Here is a suggestion as to what to do about Soviet dumping of commodities in the American market.

Let present manufacturers buy this equipment and resell it. This would reduce some of the cost of equipment to American purchasers and the profit on this equipment would make up for the lost sales of the importing companies' own products, thus protecting an industry that is vital to our country.

If the Soviets can make equipment with slave labor, by all means let them do it. Doesn't it seem reasonable that every purchase made under the above conditions would weaken the slave labor Soviet economy that much more?

I can visualize competitive bidding by manufacturers for this material (this would include chemicals as well as equipment). There might be a

stipulation that only manufacturers could purchase imported material for resale, so that the profits from these transactions would go directly to the industries which the Soviets aim to hurt by this dumping.

HARRISON McDONALD
Development Chemist
Ideal Industries, Inc.
Sycamore, Ill.

Deals with Russia held good only for short range

Dear Editor:

Carol Belton's letter (June CP, page 7) does a nice job of presenting the basic truth that must be understood when dealing with the Communists. Any seemingly advantageous deal is for the short range, and for the Communists its only purpose is in some way to further their unchangeable goal to subject the United States to the Communist will. For in the U. S. lies their only deterrent to world domination, and any company involved with them is aiding them to this end.

B. O. SEVERSON
Monsanto Chemical Company
Nitro, W. Va.

Some face impossible job in achieving higher profits

Dear Editor:

Mr. Young's conclusions (July CP, page 24) seem very reasonable and logical. Generally, all specialized chemical companies like our own have a certain opportunity of regaining profit margin levels of the early '50's. We at Nalco have such an objective. However, heavy-chemical companies have an almost impossible task in this respect.

The reasonableness of Mr. Young's conclusions is alarming in itself. It may reflect not only the capacity and pricing

conditions which he describes, but also a certain resignation to lower profit margins in the chemical industry and a psychology of management which accepts them.

This may have resulted from the capacity and competitive struggles of the past few years. Or it may represent a new kind of thinking in the chemical industry, introduced by companies which have entered the industry from other and less profitable fields.

If there is a basic acceptance of the inevitability and reasonableness of lower profitability in chemicals, it bodes no good for the industry. The expansion of recent years could not have occurred without high profitability and neither can full growth for the future.

Chemical industry management should not accept reduced profitability as being inevitable and should resist those competitive and expansion philosophies which encourage it.

H. R. POWERS

Executive Vice President

Nalco Chemical Company

Chicago, Ill.

Yep, we goofed

Dear Mr. Vaaler:

On page 30 of the August issue of *CHEMICAL PROCESSING*, the word "stoichemical" appears. This is the first time I have seen this word in print and I cannot find it in the dictionary. I was wondering if this is a new word or a typographical error of the commonly used word "stoichiometrical."

My curiosity has been aroused and I wonder if you can set me straight.

N. D. PUFFER

Duplicating Products Engineer

Minnesota Mining and Manufacturing Company

St. Paul, Minn.

(Editor's Note: Our collective editorial faces are red.)



THE WHOLE CHEMICAL
WORLD FITS NICELY
IN VULCAN STEEL
PAILS AND DRUMS



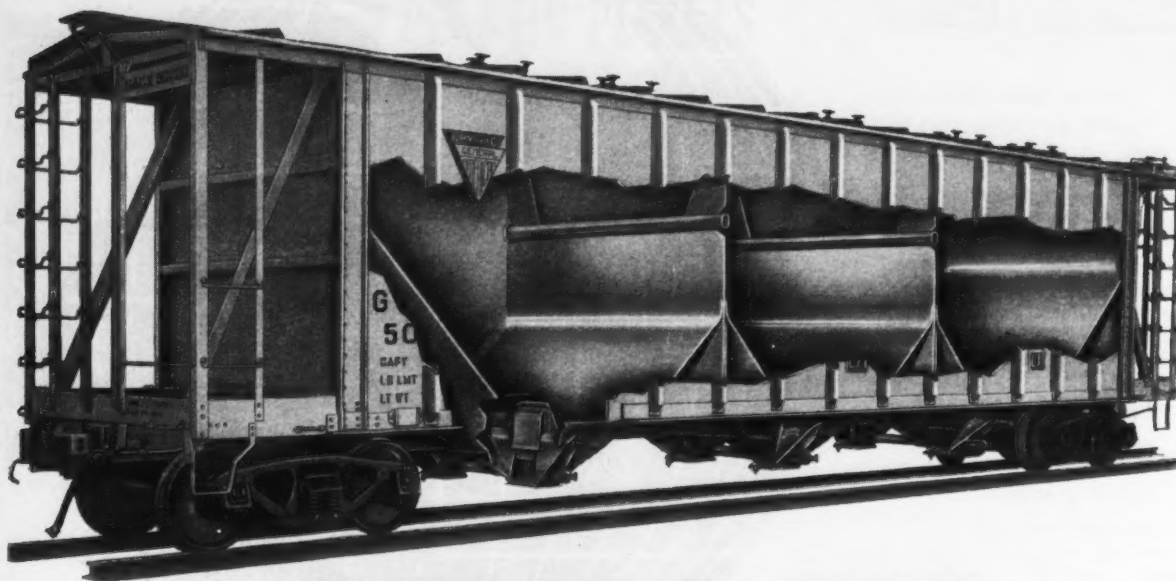
CP-109

Attach this ad to your calling card and mail today for ☐ free literature, or ☐ a meeting with your local 'Vulcansultant' a technical man who can help you with your container problems. • In California: Vulcan Containers Pacific Inc., San Leandro • In Canada: Vulcan Containers Limited, Toronto, Vancouver, B.C.

VULCAN CONTAINERS INC., Bellwood, Illinois, Phone: LInden 4-5000

Check 1010 opposite last page.

Ship Chemicals, Food Stuffs, Feed Ingredients in bulk in the New



DRY-FLO* CAR

General American's new Dry-Flo car brings the economies of bulk shipment to many dry, granular or powdered products which otherwise require bags, drums or containers.

Competitive in price with ordinary covered-hopper cars, the Dry-Flo car keeps the lading contamination-free and seals it from the outside air.

The Dry-Flo car can be loaded easily and quickly by either pneumatic or

mechanical systems. Rounded hopper corners and clean interior lines eliminate hang-up points, insure complete discharge of product. Interiors can be coated.

All this adds up to important savings for shippers.

Consult us about *your* shipping problems. If you make, buy or sell dry, granular products, chances are you will profit from shipping by Dry-Flo car.

*Patent Rights Reserved

IT PAYS TO PLAN WITH GENERAL AMERICAN

Airslide and Dry-Flo Car Division

GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South LaSalle Street • Chicago 3, Illinois
In Canada: Canadian General Transit Co., Ltd., Montreal



Check 1011 opposite last page.

LETTERS

Relative negative relative usage called meaningless

Dear Sir:

Your various contributions to the interpretation of industrial practices have finally forced me to complain of a very real and very common custom in the reporting of "analysis" of "technical" data.

It appears on occasion in the best of literature, but (unfortunately to me) one example of it makes suspect an entire research report. It is the *relative negative relative*: e. g.:

10 times smaller
6 times shorter
100% lower
Twice as cold
5% cheaper
Twice as light (weight)
Half as dark (color)

While size, length, height, heat, cost, weight, and brightness are all *relative* terms, they are also *positive* and can be measured and compared. But use of their *negative* counterparts leaves no reference basis for comparison. It contrives to deceive by leaving the impression that 10 times smaller is 1000% more efficient.

Use of the *relative negative relative* is an easy way to avoid awkward phrasing. A thing may be smaller; it can *never* be 100% smaller, let alone 10 times smaller.

But this is easier to say than "10% as large" or "90% less in size," which is what I presume is intended by "10 times smaller"—if indeed I do not abandon the entire article when I read the first such absurd *relative* reference to a *negative relative*.

This line of logic leads to endless whimsies, but I wish to assure you that the subject is a *serious* one to me—particularly as it is violated so frequently by both "science" workers and writers. Am I the one who lacks comprehension of comparisons?

G. W. GREENWOOD
Dunbar, Pa.

For more information on product at right, specify 1012 . . . see information request blank opposite last page. ➤

CHEMICAL PROCESSING

27th EXPOSITION OF CHEMICAL INDUSTRIES

NEW YORK COLISEUM • NOV. 30—DEC. 4



A "UNIVERSITY" OF NEW IDEAS

Here is the most practical "school of learning" for anyone concerned with management, design, research and development or production in the process industries. Here, at the Exposition of Chemical Industries, you will get a concentrated "course" in What's New—and how it can be put to work for you.

In five short days you can see and compare the newest product developments of over 500 leading manufacturers—all under one roof. Here you can learn about new ideas for cutting costs, improving your product and increasing production. In no other way can you see so much or learn so much that will be helpful to you in your business.

Make your plans to attend. See next page.

SEE THESE NEW PRODUCTS AT THE

27th EXPOSITION OF CHEMICAL INDUSTRIES

Abrasives
Absorbers
Acids
Acidifiers
Acid Resisting
Materials
Adhesives
Agitators
Air Conditioning
Apparatus
Alkalies
Alloys
Analyzers
Asbestos
Autoclaves
Bags
Balances and
Weights
Barrels, Drums &
Kegs
Blowers
Bottling Machinery
Brick, Acid Proof
Briquetting and
Tablet Making
Machinery
Buckets, Elevator
Burners
Calciners
Calorimeters
Cans
Carbon
Castings
Catalysts
Cement
Centrifugals
Ceramics

Chemical Stoneware,
Acid Proof
Chemicals,
Industrial
Chemicals,
Laboratory
Chemicals,
Pharmaceutical
Chlorinators
Clarifiers
Classifiers
Coal Tar Oils
Coatings—
Protective
Collectors
Colloid Mills
Colorimeters
Comparators
Compressors
Concentrators
Condensers
Containers
Control Apparatus
Controllers
Conveying
Machinery
and Equipment
Coolers
Cooperage
Crucibles
Crushers, Grinding
Mills and
Pulverizers
Crystallizing
Equipment
Cylinders for High
Pressure Gases

CO₂ Recorders
Decolorization and
Purifying
Materials
Digesters
Dissolvers
Distilling Machinery
and Apparatus
Drums, Rotary,
Vacuum
Drying Machinery
and Equipment
Dust & Fume Col-
lecting Systems
Dust and Spray
Masks
Ejectors
Elevators
Emulsifiers
Emulsions
Evaporators
Exhausters
Extraction Plants
Extractors
Fans
Feeders
Fillers
Filling Machines
Filter Aids
Filter Cloth
Filter Paper
Filters
Fittings
Furnaces and
Accessories
Gages

Gases
Glass—Optical
Glassware
Grating
Grinders
Heat Exchangers
Heaters and Heating
Equipment
Homogenizers
Hoods, Fume
Indicators
Instruments, Optical
Instruments of
Precision
Instruments,
Testing
Insulating Material
—Heating, Elec-
tric and Molded
Insulation, Furnace
Joints, Flexible
Kettles
Kilns
Labeling Machines
Laboratories, Testing
Laboratory Appara-
tus and Supplies
Laboratory Furniture
Lead Burning and
Coating
Magnetic Separators
Masticators
Material Handling
Equipment
Metal Coating and
Plating
Metal Containers
Metals
Meters
Microscopes
Mills
Minerals
Mixing and Knead-
ing Machinery
Molding Machinery

Motors, Electric
Naval Stores
Nitrators
Nozzles, Spray
Nuclear Products
Ovens
Packaging Equip-
ment and Supplies
Packing
pH Equipment
Pipe and Fittings
Plastics
Plasticizers
Platinum—Wire,
Sheet, Foil, Cruci-
bles, Laboratory
Ware
Pressure Relief and
Rupture Relief
Devices
Pulverizers
Pumps
Pyrometers
Recording
Instruments
Rectifiers
Refractories
Refrigerating
Equipment
Regulators, Pressure
and Temperature
Resins and Oils
Respirators
Rotameters
Rubber Products
and Equipment
Safety Equipment
Scales
Screens—Inclined,
Vibrating,
Gyratory
Sealing Machines
Separators
Sieves, Laboratory

Sifters
Sinks, Laboratory,
Acid Proof
Sizers
Solvent Recovery
Equipment
Solvents
Spectrographs
Spectrometers
Speed Reducers
Spray Drying
Systems
Steel Grating and
Flooring
Sterilizers
Stillers
Strainers
Switches
Tachometers
Tanks
Thermometers
Thickening and
Dewatering
Machinery
Tower Packing
or Filling
Towers
Traps, Steam
Tubes
Tubing
Turbines
Valves and Fittings
Ventilating
Apparatus
Vibrators
Viscosimeters
Waterproofing
Compounds
Water-Conditioning
Equipment
Waxes
Welding Equipment
Wire Cloth
X-Ray Equipment

OVER 500 EXHIBITS

NEW PRODUCTS
NEW COST-SAVING IDEAS
NEW AND BETTER WAYS
TO INCREASE PRODUCTION

Plan now to see actual demonstrations of the newest develop-
ments in products such as those listed above. Bring your associates
and actually see how these products can be used to advantage in
your plant. You'll learn a lot from the fact-filled displays that will
fill the Coliseum to capacity. Fill in and mail the coupon now.
You will be well repaid for the modest investment in time.
Act now!

Management: International Exposition Company

27th EXPOSITION OF CHEMICAL INDUSTRIES 480 Lexington Avenue, New York 17, N. Y.

Please register me in advance and send admission badge

Name _____ Position _____
Company _____
Street _____
City _____ Zone _____ State _____
Products made or
type of business _____

ALSO BADGES FOR THESE:

Name _____ Position _____
Name _____ Position _____
Name _____ Position _____

CP

FREE Advance
Registration

Fill in and mail this card NOW!
No further registration necessary.
Your badge will be mailed to you
and will admit you to the EX-
POSITION as many times as
desired. Badge is not transferable.

\$30 Million Expansion Program Under Way at Olin Mathieson

Olin Mathieson Chemical Corporation is spending \$30 million on a four-point expansion program. This sum is in addition to expenditure of \$4 million in a joint venture with Sun Oil Company to produce urea at North Claymont, Del.

In the program, new facilities at Brandenburg, Ky., are designed to produce glycerin, epichlorohydrin, propylene oxide, propylene glycol, and polypropylene glycols. Target date for completing the glycerin and epichlorohydrin units—under a Certificate of Necessity—is early 1961. Production of the other materials is expected to begin January 1.

Also at Brandenburg, existing facilities are being expanded to double production of glycol ethers, surfactants, and ethylene dichloride.

A plant to manufacture sulfamic acid is under construction at Joliet, Ill., with production scheduled to begin January 1.

Existing chlorine production facilities at Niagara Falls, N. Y., have been improved with installation of new electrolytic cells.

Gulf Oil Corporation now has in operation a new unit at its Port Arthur, Texas, refinery producing more than 30 million gal annually of high-purity benzene. Substantial amounts of toluene also are being made.

Du Pont is forging ahead with plant construction. At Beaumont, Texas, work is progressing on a plant which will have initial capacity of 50 million lb a year of caprolactam. Provision has been made in the design of the multi-million-dollar facility for a substantial increase in capacity. Operations are expected to begin by the end of 1960. A new process will be used.

At Victoria, Texas, workmen are shooting for an early 1961 completion date on a major facility to manufacture polyethylene resin. It will become the company's second polyethylene plant. The Sabine River Works at Orange, Texas, will continue as the firm's major facility for this material.

Celanese Corporation of America has organized three new companies—Celanese Fibers, Celanese Chemical, and Celanese Plastics. They succeed the former fibers, plastics, and chemical divisions, and will function as operating divisions of the parent company.

Sun Oil Company has under construction at its Marcus Hook, Pa., refinery a \$2 million unit to produce 120 million pounds of propylene a year with a purity of 99 percent. Material will be made by simple fractionation of propane, ethane, and butane from catalytic cracking units and gas stabilization plants. The unit is scheduled to go on stream by year's end.

Minnesota Mining & Manufacturing Company has announced plans to build a \$4.5-million chemical plant at Decatur, Ala. Fluorochemicals will be the primary products, but specialty and modified chemicals for internal use also will be made. Plant is expected to be in full operation by the end of 1961.

American Cyanamid Company already is increasing capacity of its nearly completed maleic anhydride plant at Bridgeville, Pa., from 14 million lb to 20 million lb annually. Facility is expected to be on stream before end of year, with expansion scheduled to be completed in about seven months.

Reichhold Chemicals, Inc. now has in operation a \$500,000 formaldehyde plant at Kansas City, Kan., with a capacity of 30 million lb annually.

To page 18

**a direct
approach**



**to your
filtration problem**



Sperry Filter Presses can be made with new glass-reinforced Polyester plates and frames.

A filtration problem that's unique to you ... is probably "old hat" to Sperry.

Through 90 years of filtration leadership, Sperry has solved thousands of filtration problems for hundreds of industries—continually applying new ideas—new techniques—and new engineering know-how to produce *flexible, superior filtration at low cost!*

Sperry makes this priceless experience available to all industries—everywhere! To introduce it to your plant, simply write for a copy of Sperry's comprehensive filtration catalog. It's yours, without cost or obligation.

SPERRY

FILTER PRESSES · FILTER MEDIA · CLOSING DEVICES · PLATE SHIFTERS

FREE SPERRY CATALOG

The outstanding performance of low-cost Sperry Filtration merits your further investigation. Write today for your free copy of the complete Sperry Catalog, including detailed information of Sperry's Plate-Shifters, Closing Devices and other Labor-Saving Accessories.

D. R. SPERRY & CO. BATAVIA, ILLINOIS

Sales Representatives
George S. Tarbox
808 Nepperhan Ave., Yonkers, N. Y.
B. M. Pilshay
833 Merchants Ex. Bldg., San Francisco, Cal.
Aldredge & McCabe
847 E. 17th Ave., Denver, Colorado
Texas Chemical Eng. Co.
4101 San Jacinto, Houston, Texas

D. R. SPERRY & CO.

Batavia, Illinois

- ☐ Send Free Sperry Catalog
☐ Have your Representative Contact us CP-10

Name _____

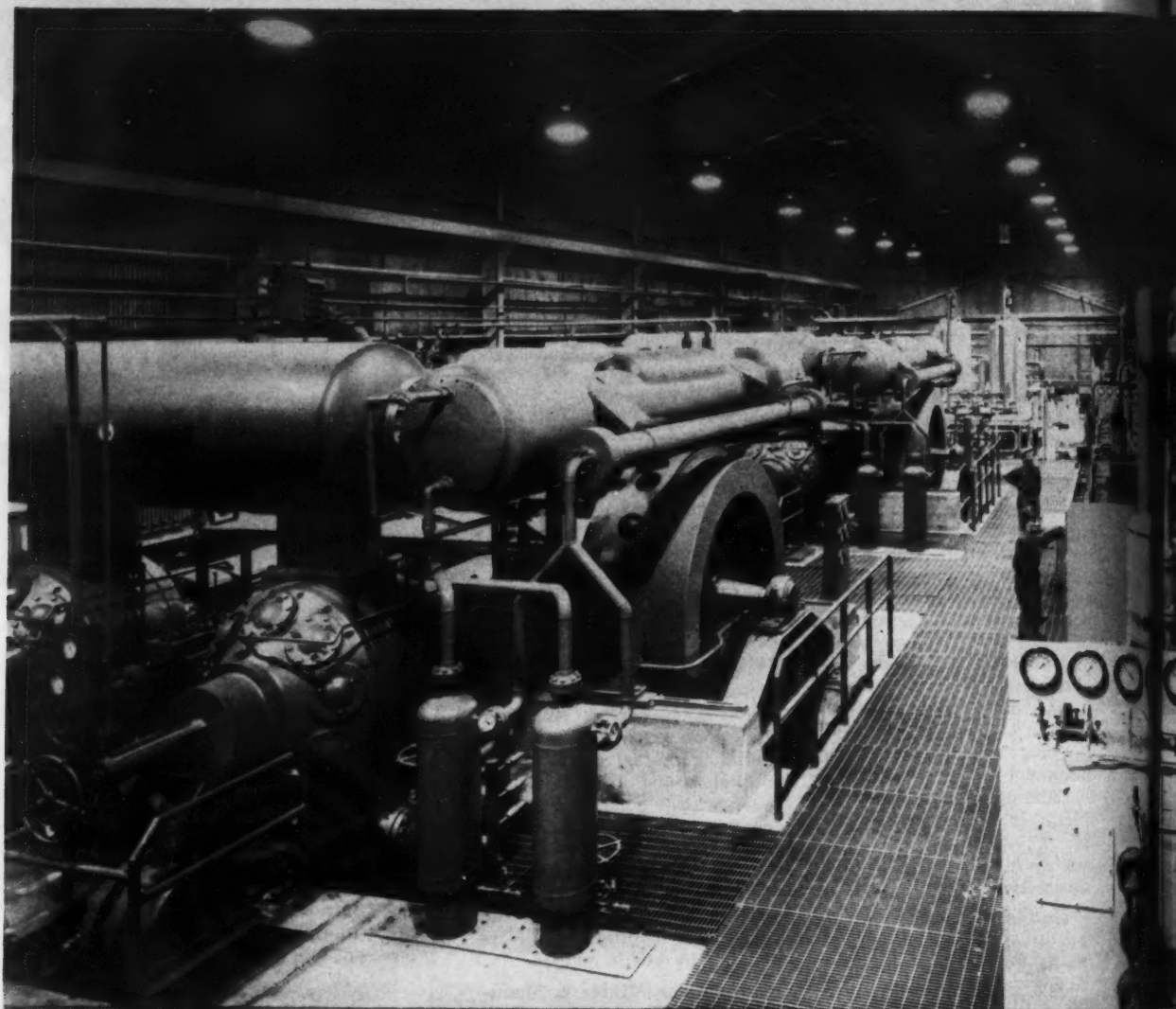
Company _____

Address _____

City _____ State _____

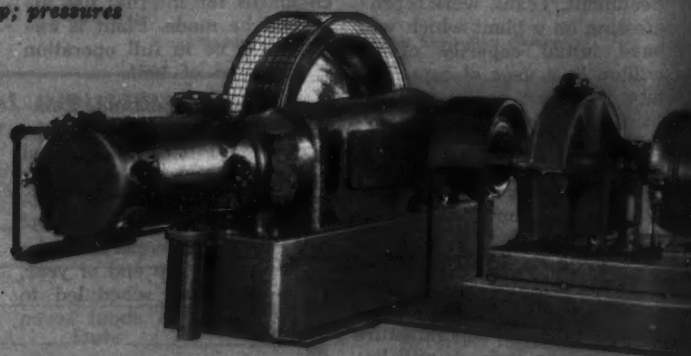
Visit our booth 1362 at the 11th National Chemical Exposition

Check 1013 opposite last page.



Class "FE" horizontal, balanced-opposed compressors; 3,500 hp; five-stage; 5,000 psig.

*Type "T" single-stage, oil-less cylinder gear-driven hydrogen recycling compressor.
Horizontal, straight line, double-acting types; single or multi-stage;
lubricated or non-lubricated; 15 to 150 hp; pressures
up to 5,000 psig.*



Chicago Pneumatic

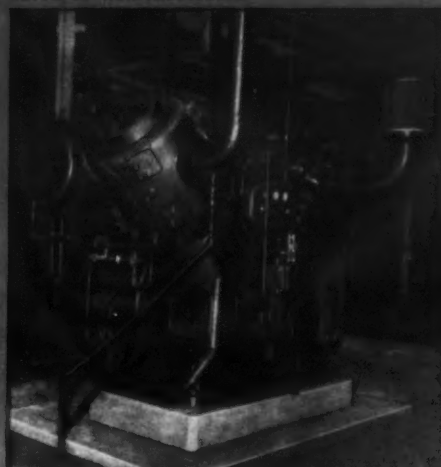
8 West 44th Street, New York 17, N. Y.

AIR AND GAS COMPRESSORS • VACUUM PUMPS • PNEUMATIC TOOLS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS

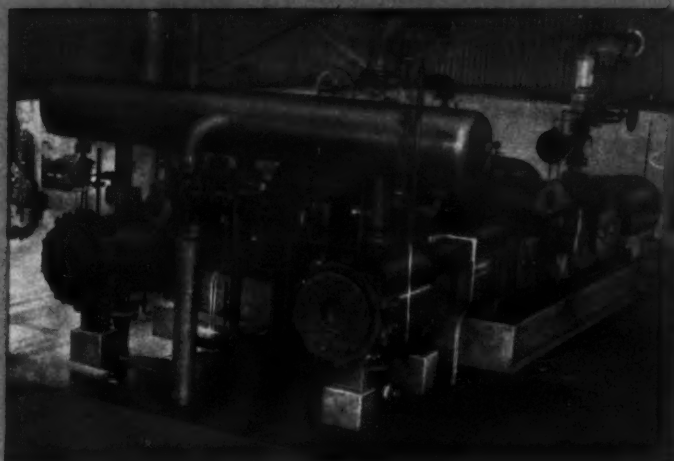


Type "P" air-cooled, motor driven compressor; 7½ to 125 hp.

Class "T" centrifugal-type compressor, 7½ to 100 hp; pressures up to 5,000 psig; lubricated or non-lubricated.



Class "H" four corner, steam-driven compressor; 150-1400 hp. One of two 30" stroke, 1,000 hp hydrogen recycling units.



from
VACUUM to
15,000 PSIG
7½ to 5,000 HP

There's a CP COMPRESSOR for every process need

For more information on product at left, specify 1014 see information request blank opposite last page.



they're **NEW**

they're
pneumatic



The Cleveland Vibrator Company presents: Cleveland's new vibrating feeders and conveyors to handle your difficult-to-move bulk chemicals—safely—surely—accurately.

Only one moving part. Mounting is easy, no springs to tune . . . and the cost is surprisingly low.

Variable flow completely controlled, with instant start and stop.

Write today for complete information and prices.



Dept. 10C, 2706 Clinton Ave.
Cleveland 13, Ohio

Check 1015 opposite last page.

CHEMICAL BUSINESS

From page 15

nually. It is the company's seventh domestic formaldehyde plant.

Miles Chemical Company, Elkhart, Ind., expects to have in operation this fall expanded facilities to produce citric acid. Cost of the expansion is estimated at \$3.6 million. Production should exceed 15 million lb annually.

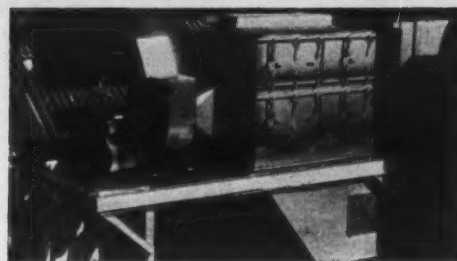
Heyden Newport Chemical Corporation hopes to complete construction within two years of a 24 million-lb-a-year plant at Fords, N. J., to manufacture maleic anhydride and fumaric acid.

Monsanto Chemical Company's Inorganic Chemicals Division is building a plant near St. Charles, Mo., to manufacture ultra-pure silicon metal.

Amoco Chemicals Corporation is building facilities at Joliet, Ill., to manufacture high impact and conventional polystyrene. One will be a large scale commercial plant; the other a product development unit. The former is expected to be completed in the third quarter of 1961. The latter, which will manufacture a variety of polymers for customer evaluation, is scheduled to be in operation by the second quarter next year.

Phillips Chemical Company is expected to complete construction next month of a multi-purpose chemical unit at its Philtex plant near Borger, Texas. Facility will enable the company to upgrade further some of the vast supplies of hydrocarbon feedstocks it produces in the area.

Colton Chemical Company, a division of Air Reduction Company, Inc. is expanding production and storage facilities at Elkton, Md., with addition of a multi-million-lb ester plant, warehouse and bulk storage tanks. Project is scheduled for completion this year. The ester facility will manufacture dibutyl maleate, dibutyl phthalate, and similar products used in emulsion systems.



Barely visible discharge from exhaust in this unretouched photo shows how Dustex Miniature Cyclone Collector ended a problem for Perlite Products Co.—while recovering 70 lbs./hr. with no maintenance.

"95% PREDICTED EFFICIENCY PROVED . . .

and Collector is maintenance-free!"

Frank W. Schaffer, President of Perlite* Products Co., Primos, Pa., writes this about his Dustex Miniature Cyclone Collector purchased on a basis of the Dustex Single Tube Determination test:

"Your predicted efficiencies of 95% are proven . . .collecting 70 lbs./hr. of 85% below-325-mesh material at 450°F...complaints on discharge are ended, and the collector is maintenance-free."

*Perlite . . . extremely lightweight material for insulation and filtration, with a bulk density as low as 3.5 lbs./cu. ft.

Write Today for Dustex Bulletin "A Simplified Test Method" describing actual collection test at your plant at no obligation.



25 ANDERSON ROAD • BUFFALO 25, N. Y.

Check 1016 opposite last page.

GRIND BETTER BY

IMPACT



For closely controlled particle size reduction, minimum temperature rise, high abrasion resistance and low horsepower requirements with no grinding tolerances to maintain.

RECENT APPLICATION

Grinding raw glass scrap to 95% minus 16 mesh. Entoleter® Impact Mill with wear resistant impactors for economical tonnage processing of this extremely abrasive material.

- Vibrating Screens
 - Centrifugal Impact Mills and Mixers
- Send for complete literature.



Free test runs on your material.



ENTOLETER

DIVISION OF SAFETY INDUSTRIES, INC.

P. O. Box 904 New Haven, Conn.

Check 1017 opposite last page.

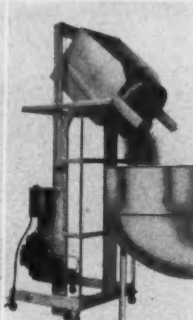
CHEMICAL PROCESSING

NOW YOU CAN LIFT and DUMP ANY CONTAINER



HYDRO-DUMPER

Dumps up to 4 feet. Load capacity, 6000 pounds.



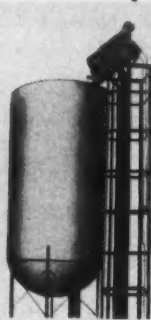
JUNIOR DUMPER

Dumps up to 8 feet. Load capacity, 700 pounds.



SENIOR DUMPER

Dumps up to 20 feet. Load capacity, 4000 pounds.



VERTICAL DUMPER

Dumps to any practical height. Load capacity, 4000 pounds.

Yes, no matter what size, shape or type container you use to receive, store or process free-flowing material — or whether it's a special in-plant container — ESSEX can supply the necessary dumper.

ESSEX dumpers are flexible in design so they can be modified to suit your job conditions. For the safe, reliable, economical way to lift and dump material in any container, call upon ESSEX for the answer.

SEND FOR NEW 8 PAGE INFORMATIVE CATALOG NO. 59
ESSEX CONVEYORS, INC.

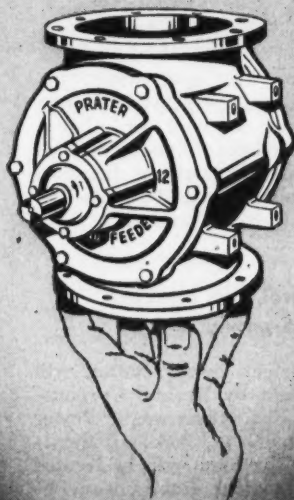
Dept. CP, 165 Franklin Avenue, Nutley 10, New Jersey

Check 1018 opposite last page.

PRATER — the recognized leader

ROTARY AIRLOCK FEEDERS

for
DUST CONTROL
and
PNEUMATIC
CONVEYING



WRITE FOR BULLETIN P58

PRATER PULVERIZER COMPANY

1513 South 55th Court • Chicago 50, Illinois

Check 1019 opposite last page.

CHEMICAL BUSINESS

Linde Company, division of Union Carbide Corporation, is building a 500-ton-a-day oxygen plant at Great Lakes Steel Corporation's plant at Ecorse, Mich. It will be capable of producing 365 million cu ft of high-purity oxygen a month.

Spencer Chemical Company has placed on stream at Vicksburg, Miss., an argon plant with a rated capacity of 3 million cu ft a month. The facility, said to be the first of its type built in the United States, utilizes as feed stock an argon-enriched waste gas stream from an existing ammonia plant.

Mobil Oil Company has in operation a sulfur recovery plant at its Paulsboro, N. J., refinery which has a capacity of 100 short tons a day.

Michigan Chemical Corporation's new magnesium oxide plant at Port St. Joe, Fla., is now operating.

Stepan Chemical Company is building a million-dollar administration and research center in Northfield, Ill. Completion is set for January.

Next month . . .

CHEM SHOW PREVIEW

November 30th marks the start of the huge five-day 27th Exposition of Chemical Industries in New York City's Coliseum.

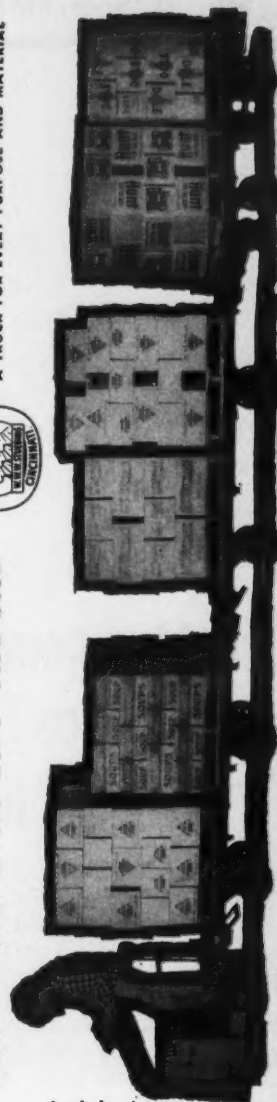
November 1st marks the day you will get your copy of November CHEMICAL PROCESSING magazine, in which there will be a preview of the Show. Geared to help you pre-plan your course around the Coliseum's four floors, this feature will tell you ahead of time of new developments in equipment, instrumentation, and chemical materials to be introduced at the Show.

It's must reading for you and your associates planning to attend. Look for it next month.

A TRUCK FOR EVERY PURPOSE AND MATERIAL



HydroLetric A GREAT NAME IN LIFT TRUCKS



This powerful HydroLetric Tractor hauls one or multiple units with speed, safety and ease of operation. Features the exclusive DYNA-DUAL POWER UNIT. Power enough to pull loads of 6000 lbs. or more at low cost.

Write for Bulletin KT

LIFT TRUCKS, INC.

2427 Spring Grove Avenue, Cincinnati 14, Ohio

Check 1020 opposite last page.

Life in these excited states...



"So you've got some leaks... look, new pipe costs money!"

Troubles coming in waves? Try Ace-Ite pipe

Ace-Ite Plastic Pipe... a tough, chemical-resistant ABS rubber-resin blend... is the surest way to stem the tide of corrosion. One of eight types of Ace pipe, it's ideal for general use, handles most chemicals. It's been around long enough so we know what it'll do. And you'll like the price. Ask for Bulletin CE-80.

Ace chemical-resistant rubber-lined steel pipe best for high-pressure, big sizes, or abrasives. Pipe, fittings and valves 1½ to 24".

STRENGTH OF STEEL



Highly efficient WE pump. Capacity to 360 gpm. Cast iron, fully protected by top quality, chemical resistant hard rubber lining.

BIG GIANT OF ACID PUMPS



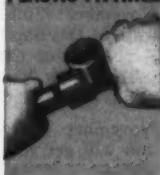
Design assistance and facilities for molding special fittings, pump parts, etc., of plastics or hard rubber. Also large hand-fabricating facilities.

CUSTOM MOLDED OR HAND BUILT



Variety and quality to match any plastic piping. Riviclor PVC, Ace-Ite rubber-plastic, Parian poly, Ace Saran, Tempron high temperature nitrile, hard rubber-lined steel.

Supermarket for PLASTIC FITTINGS



ACE

processing equipment of rubber and plastics

AMERICAN HARD RUBBER COMPANY
DIVISION OF AMERACE CORPORATION
Ace Road • Butler, New Jersey

ACE

See our pages in
eee
Catalog!

Check 1021 opposite last page.



nuclear notes

Significant news about atomic energy

Nuclear fuel reprocessing symposium scheduled

Two-day symposium on reprocessing of nuclear fuels will be held October 20-21, 1959, at the Hanford Works, Richland, Washington. Sponsored by the AEC in cooperation with AEC contractors, meeting will review the technology currently available for reprocessing spent fuels.

(Further information may be obtained by writing to J. T. Christy, Hanford Operations Office, U. S. Atomic Energy Commission, Richland, Washington.)

Heavy water plant to Chemical Corps

AEC has released its Dana, Indiana, heavy water plant to the Army Chemical Corps. Plant has been in standby condition since June, 1957. Original cost was about \$100 million.

Radioisotopes catalog — 1959 edition

Oak Ridge National Laboratory has issued the 1959 edition of its radioisotopes catalog. The new catalog includes all approved price changes as well as current technical data. Catalog may be obtained by writing direct to the laboratory at P. O. Box X, Oak Ridge, Tennessee.

Bechtel gets contract for A-power station

Nuclear power station will be built by Bechtel Corporation for Consumers Power Company of Jackson, Michigan. The plant will be located at Big Rock Point, near Petoskey, at northern end of Michigan's Lower Peninsula. Initial capacity will be 50,000 kw with operations scheduled to begin in 1962. Estimated cost is \$30 million.

AIRETROL



automatic tube expansion control

rolls ¼"-1½" O.D. tubes pneumatically faster than you ever thought possible. Average worker easily rolls up to 12 tubes per minute.

Here's why...



Operator dials desired torque in ft.-lbs. on micrometer head. Precision torque-sensing mechanism automatically stops expansion at this setting... maintains .001" accuracy consistently. Result? More work per man-hour, operator error eliminated. Write for Bulletin No. 64 or plant demonstration.



BRANCH OFFICES: New York, Chicago, Tulsa, Philadelphia, Houston, Baton Rouge.
REPRESENTATIVES: in principal cities of U.S.A., Canada, Mexico, South America, England, Europe, Puerto Rico, Italy, Japan, Hawaii.
EUROPEAN PLANT: Vlaardingen, The Netherlands
CANADIAN PLANT: Brantford, Ontario

Check 1022 opposite last page.

CHEMICAL PROCESSING

Superheated steam at 1000°F produced by reactor

Nuclear superheated steam at 1000°F has been generated by heat from Sodium Reactor Experiment (SRE) at Canoga Park, California. Molten sodium, the heat transfer medium, reached temperature of 1060°F during the run. This marks highest steam temperature ever produced by heat from a nuclear reactor. Project is being operated by Atomics International, a division of North American Aviation, Inc.

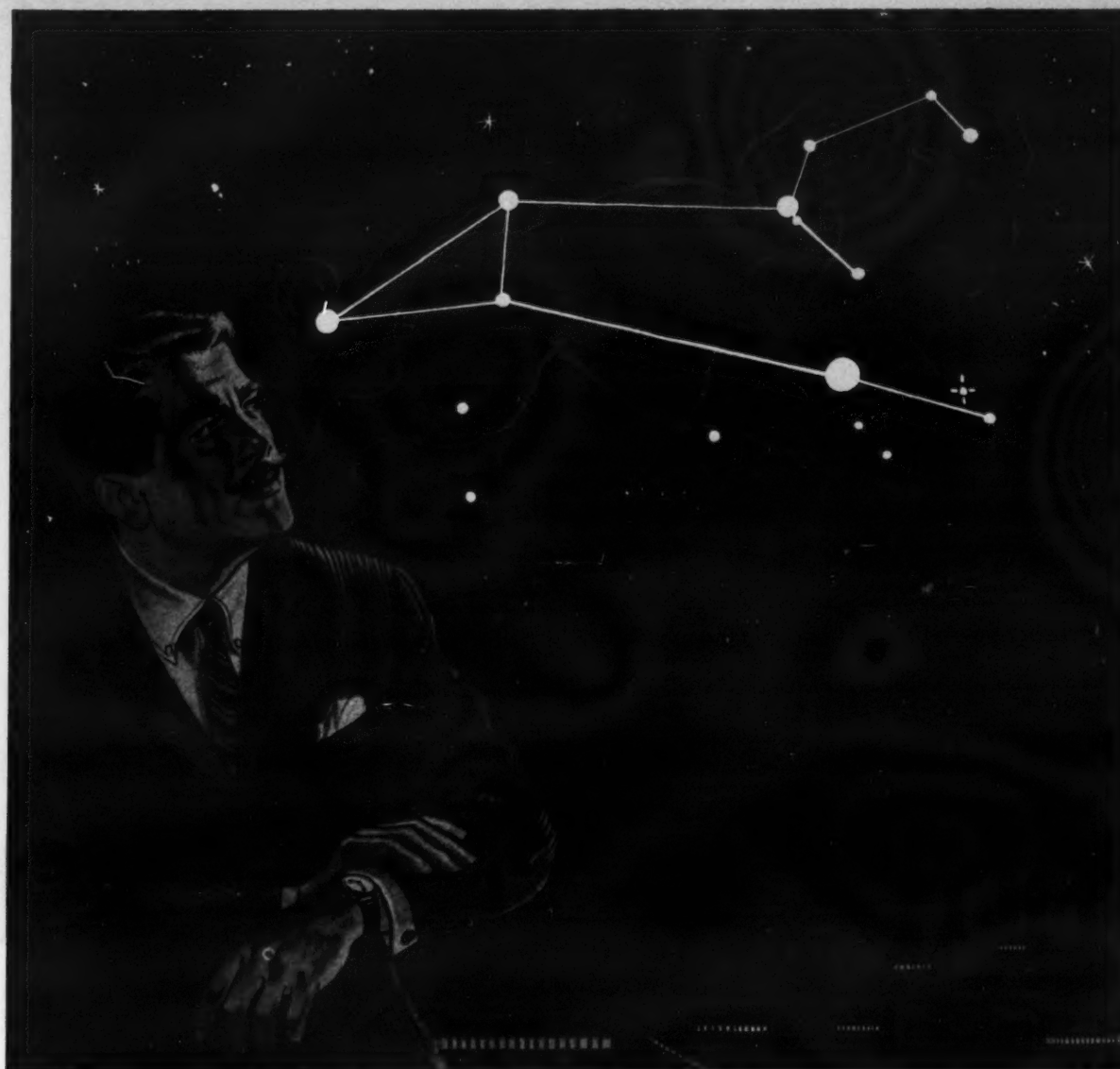
Sodium heavy water reactor concept dropped by AEC

Research and development on a liquid sodium-cooled, heavy water-moderated nuclear power reactor concept has been suspended indefinitely by AEC. Decision was based on technical and economic study. Work on concept was started in April 1957 in connection with proposal of Chugach Electric Association of Anchorage, Alaska, for construction of 10,000 kw power reactor at Anchorage.

AEC gets tough on stream pollution

Using the threat of license revocation AEC has issued follow-up orders to operators of five uranium processing mills to improve procedures for discharging radioactive waste into streams. Companies were advised that the Commission will inspect the mills to learn whether adequate measures have been taken to bring wastes within permissible disposal limits.

Plants affected are the Uravan, Colorado, and Green River, Utah, mills of Union Carbide Nuclear Company; the Durango, Colorado, mill of Vanadium Corporation of America; the Maybell, Colorado, mill of Trace Elements Corporation (a unit of Union Carbide Corporation); and the Salt Lake City, Utah, mill of Vitro Uranium Company.



RELIABILITY...

Because the movement of the stars never varies, an astronomer can determine time to the exact second by checking the position of Leo, Orion, or one of the other constellations that appear in the night skies. That's *reliability* — a word that has become a motto for Mikro-Products. Serving the rapidly growing processing industries, our reputation rides on the performance of the

equipment we manufacture . . . good reason why our standards are high . . . good reason why Mikro grinding, conveying and dust collection units are built to put greater efficiency and economy into our customers' operations. If you'd like to know more about Mikro-Products . . . about Mikro quality and reliability, the information is yours on request, and without obligation.

MIKRO-Products

Pulverizing Machinery Division • Metals Disintegrating Company, Inc.
60 Chatham Road • Summit, New Jersey

REPRESENTATIVES throughout the United States, Continental Europe, British Isles, Canada, Mexico, Central and South America, West Indies, South Africa, India, Japan, Philippines, Australia and New Zealand.
MANUFACTURING FACILITIES: United States, Canada, Continental Europe, British Isles.



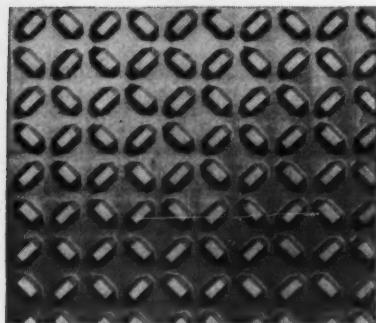
PROCESSING SYSTEMS



GRINDING CONVEYING COLLECTING



One slip can cost more than Multigrip



Your workers stand—and often fall—in slippery places. Falls account for about 1 in every 5 industrial injuries.

You can eliminate many slips and falls by installing USS Multigrip Floor Plate around machines, on loading platforms, stair treads and main shop aisles.

Multigrip means safe footing wherever it's used. Hundreds of little cleats give safe traction in any direction. Water drains off quickly. Oil

and grease can be easily removed with the usual cleaning compounds.

Saves money, too! Where floors take a heavy pounding from traffic, Multigrip will stand up for years. It won't splinter or crack and can be installed in extra wide plates. There's little or no maintenance.

For more information about USS Multigrip Floor Plate, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS is a registered trademark

Sold by leading distributors from coast to coast.



United States Steel Corporation - Pittsburgh
Tennessee Coal & Iron - Fairfield, Alabama
Columbia-Geneva Steel - San Francisco
United States Steel Supply - Steel Service Centers
United States Steel Export Company

United States Steel



A 33-year veteran with Du Pont, W. L. Stabler had a varied company career until October 1951, when he was transferred to the Employee Relations Department to form a new Organization Planning Division.

Now manager of this division, his primary responsibility is to assist company and departmental management in matters pertaining to management development. This includes maintenance of personnel inventory records on a company-wide basis in order to assure an adequate supply of qualified personnel to fill projected losses in key management positions over a long-range period.

A Princeton man, Mr. Stabler began his Du Pont career in 1926 as a rayon plant foreman. After various tours of duty, he was named manufacturing superintendent of the pioneer nylon plant at Seaford, Del., and was appointed plant manager January 1, 1941. On October 1, 1945, he was called upon to organize the newly created Personnel and Industrial Relations Division of the Rayon (now the Textile Fibers) Department and later became manager. He was with this division until being transferred to OPD.

Management morale is something more than just a measurement of whether an organization is "just one big happy family." I think it goes deeper than this — into a measurement of whether the work atmosphere within a company establishes an environment whereby each individual has the opportunity to contribute according to his abilities and be rewarded according to his contributions.

In other words, it is a measurement of whether each of us feels generally satisfied with his lot and is treated in such a manner as to bring forth our best efforts on an individual and collective basis.

Good management morale is a very vital factor in the successful execution of a business enterprise.

Morale is not static. It goes up and down, and, like all other phases of a business activity, it must receive constant attention if it is to remain at a high level. It is the difference between a heads-up organization and one which is just a so-so outfit.

There are many factors which go to make up good morale. Many are as difficult to define as it is to list reasons why a certain individual is considered a successful supervisor or manager. Probably no single factor will create this good morale, but often times it is the balance of many factors which achieves the desired results.

I am inclined to believe that one of the most important single factors is what might be called "the inter-personal or day-to-day relationships between people."

Failure of Others

In considering inter-personal relationships, I think too many of us in management have made the mistake in the past of looking too critically at the other fellow and attributing poor performance or poor morale to the failure of others. Sometimes this may actually be the case, but in many instances we may be overlooking the part which we have played

It's up to everyone in a company to help maintain good morale. One of the best ways is to keep "inter-personal or day-to-day relationships" on a high level. As a guide for supervisory personnel, this author has set up six-point checklist to aid them in determining . . .

How do you stack up on employee relations?

W. L. STABLER, Manager, Organization Planning Division
Employee Relations Department
E. I. du Pont de Nemours & Company

or failed to play in the morale situation.

It is so easy to place the blame somewhere else and to "see what's wrong with the other fellow." It is sometimes more difficult to recognize good morale and good performance on the part of an individual in this regard. In other words, most of us are probably more adept in explaining failures than we are in understanding and capitalizing upon successes.

I recently reflected on the qualities of the various people to whom I had reported. I did this in an effort to try to define what I thought it took to be a good manager. I soon concluded that there was no common mold.

Most personal relationship factors are definitely within the control of the individual, but are often lost sight of in the day-to-day hustle and bustle of getting a job done.

Great Opportunity

Anyone who has daily contacts with others has an opportunity to share in the build-up of good morale within a working unit even though he may not have full responsibility and authority for directing the efforts of others. I think the specialist often times

can make a tremendous contribution if he will just take a little time out to recognize the opportunity which his job presents to influence others.

The fundamental principles of good management morale are not, in my opinion, affected appreciably by the size or the nature of an organization. A sour apple or two in the basket or barrel can very readily lead to disease and contamination if the proper facilities are not provided for weeding out the apples which are not up to par.

I strongly urge that each of you who may have management responsibility might wish to occasionally determine how you stack up on the following:

1. Before criticizing others for their shortcomings, be sure that your own skirts are relatively clean.

2. Be receptive to personal criticism if it is properly offered and recognize that often times this criticism is an opportunity for you to see yourself as others see you.

3. Consider the other fellow's viewpoint and endeavor to establish a working relationship which will build up a high degree of mutual confidence and respect.

To page 178

Chemical Distributor Strong Link Between Producer and Consumer

He's no longer regarded as the 'middleman.' Instead, he has become a necessary economic function helping manufacturers reduce cost of sales and distribution, says this architect of a top-flight company's nationwide chemical distribution structure



The success of McKesson & Robbins, Inc.'s chemical department is mirrored in the accomplishments of F. Dean Hildebrandt, executive vice president.

Although McKesson & Robbins had distributed chemicals for 55 years prior to 1945, it was only in that year that a special chemical distribution organization was formed. Mr. Hildebrandt, as vice president and manager, headed the new unit. He gathered an experienced sales force and established a network of chemical warehouses and distributing points in key industrial areas.

So successful was the organization that in 1955 it was formed into an independent department. Mr. Hildebrandt was named senior vice president, the position he held until his recent elevation to executive vice president. Today the department offers nationwide chemical services through 44 branch sales offices, 79 chemical warehouses, and 15 bulk packing stations. More than 700 products made by 60 leading chemical manufacturers are distributed by McKesson & Robbins.

F. DEAN HILDEBRANDT
Executive Vice President
McKesson & Robbins, Inc.

Chemical distributors are carrying an increasingly important load today in marketing chemicals and are contributing significantly to the growth of the industry. Some 1900 of them are handling a volume conservatively estimated at \$2.5 to \$3 billion a year.

They are serving more and more of the essential needs of local industry in every industrial area of the country by warehousing and promptly delivering a wide variety of chemicals used in local manufacturing processes. What's more, they are performing a large part of the distribution task more economically than some producers.

As a result, producers are constantly improving their relations with distributors in order to get the most value out of the services they provide. They view the distributor's staff as an additional sales force and act accordingly. They conduct sales training meetings for the distributor's salesmen and provide sales promotion materials.

Producers are providing more technical assistance on their products for the distributor's customers and are directing their salesmen to join the distributor's salesmen for calls on customers. In short, they are recognizing distributors as effective selling partners.

The chemical industry is uniquely complex in the interdependence that prevails between producers and consumers. Producers vary widely in nature of products, volume of production, markets served, and competitive position. For

these reasons, it is difficult to establish the exact niche into which the chemical distributor fits, but he is a firm link in the marketing chain that moves bulk chemicals from point of production to point of consumption.

Although the status of his position is somewhat clouded, the distributor has certain definite services to offer. Among them are:

- 1) An established network of sales offices and warehouses which add availability to products in many different markets.
- 2) Experienced sales force which supplements producer's staff for increased coverage.
- 3) Closer attention and better service for small accounts which, while sizeable, might be costly for the producer to serve.
- 4) An opportunity to schedule production operations more efficiently in that shipments will be in bulk rather than in small lots.
- 5) Reduced selling and distribution costs brought about by minimized credit losses, lower clerical and accounting overhead for order processing, savings in labor and freight costs.
- 6) Useful data on local market conditions and competition as well as help in developing new applications for products through information gathered by his salesmen. Because he employs local men for local service, he is obliged to gage inventory closely to local needs, making him sensitive to shifts in local industry and alert to new demands for chemical products.
- 7) Prompt and effective

follow-up to inquiries and quotations. This permits producer to increase ratio between volume of actual dollar sales and dollar volume quoted.

8) Strengthened customer loyalty to a principal's products through better local service. This reduces customer migration and encourages steady and increased sales for manufacturer.

The criterion a producer must employ in determining whether to use a distributor is simply the relation between the cost of selling direct and the cost of the distributor's services. The percentage of production sold through a distributor, therefore, depends primarily on distribution cost analysis.

Re-examination of Strategy

An increasing number of chemical producers are re-examining marketing strategy and distribution costs to determine the percent of production which might be sold more economically through distributors. In analyzing markets, producers often are surprised by heavy selling costs involved in serving direct the chemical needs of a sizeable number of small accounts, as shown in Figure 1.

It is in this area that the distributor can demonstrate his worth in improving profitability of the producer's operations. Enlightened manufacturers are alert to the pitfalls of misdirected marketing effort and expenditure, and are leaning heavily on distributors for LCL and LTL marketing. They also have

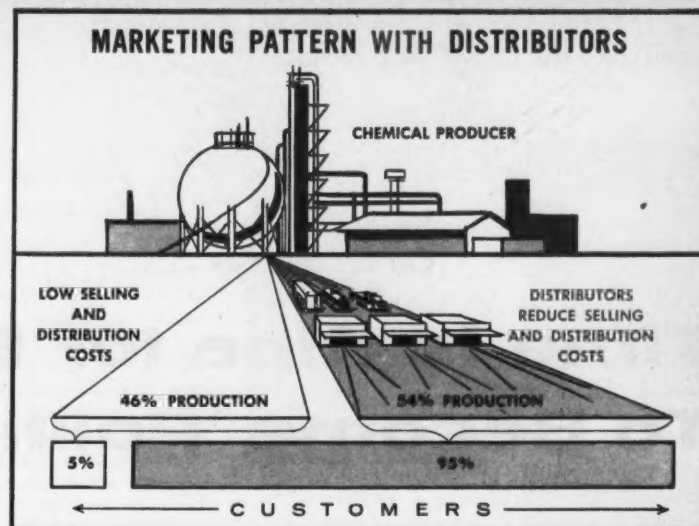
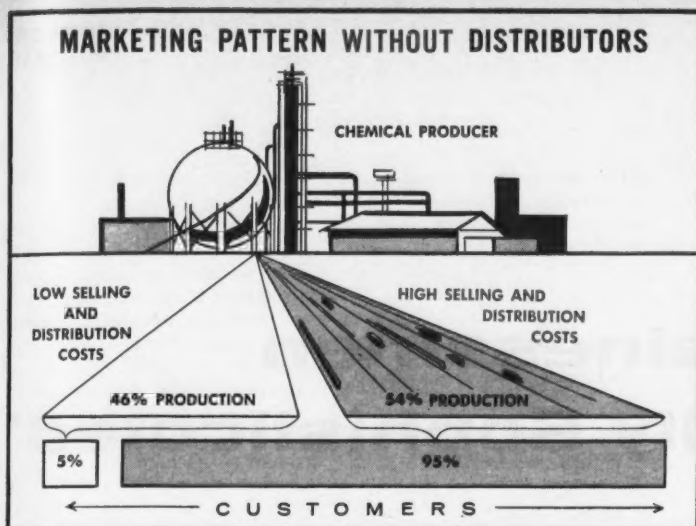


FIGURE 1

learned that through distributors' services they can capture potential new markets.

Consider the customer who buys only one to eight drums a month of various chemicals from each of five or six producers. From the individual producer's viewpoint, this customer is not an important buyer, and he is costly to serve, as Figure 2 points out.

But this is a good account for the distributor who can afford to make regular calls to sell all of these chemicals under each producer's original labels, at the same price, or on direct shipment from one convenient warehouse. The distributor's operating costs can be spread over a broader base

because usually he has a wider selection of chemicals to sell than any one producer.

Despite certain advantages a distributor has to offer, there yet remains some criticism and distrust from the early "wheeling-dealing" days of chemical distribution. Much of it centers on misunderstanding of the distributor's function and a failure to recognize reasonable limitations in the distributor's marketing role.

Specialty Trained Men

While it is generally true that introduction of new products — especially those requiring careful technical service — is outside the abilities

of the average distributor, this limitation is being overcome by close cooperation between producer and distributor. In fact, when justified by sales responsibility and volume, some chemical distributors employ their own specially trained men for this type of work.

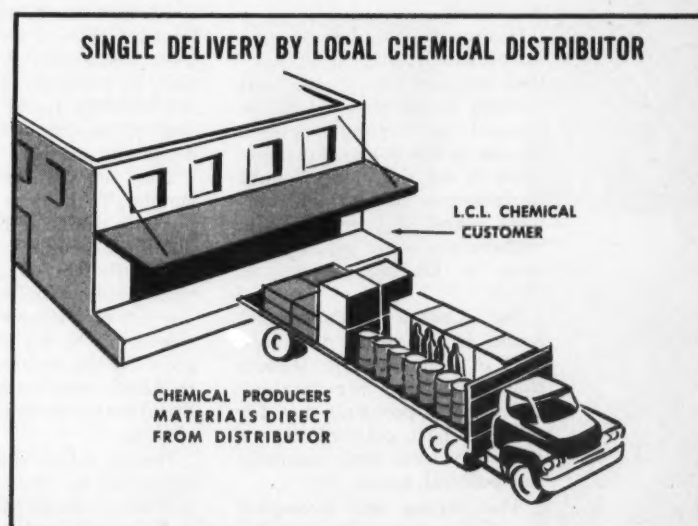
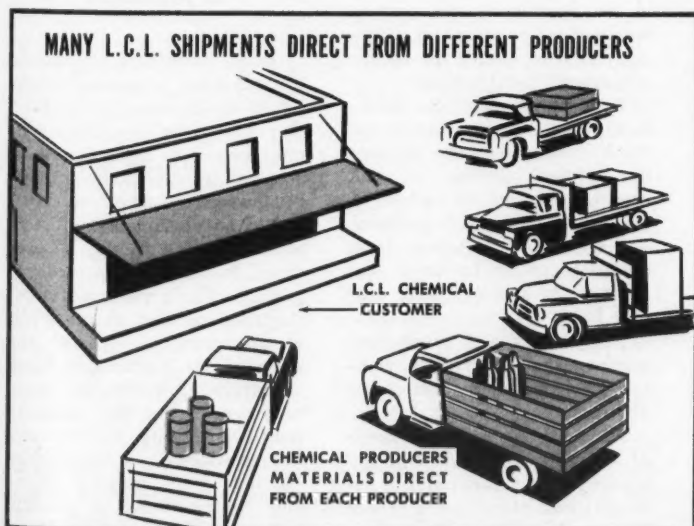
Some critics argue that distributors lack sales impact because their salesmen usually have a wide line of merchandise to sell. On the contrary, this completeness of service and its close availability at point of need give a distributor an advantage over the sales impact of the individual producer.

To page 180

How a chemical distributor reduces cost of sales and distribution for the producer is graphically illustrated here. Forty-six percent of this producer's output was purchased by less than 5 percent of his total customers. Selling costs for this segment of his business was unusually low. On the other hand, costs of selling the remaining 54 percent of production to more than 95 percent of his customers was exorbitantly high.

When a customer makes small purchases of a variety of materials from different sources, each producer finds this business is costly and of relatively little importance to his over-all operations. But when the customer consolidates these purchases through one distributor, the customer's account becomes one of importance and one that is served economically.

FIGURE 2



CPI Leaders Say . . .

Time Is Ripe for Businessmen To Become 'Politically Sophisticated'

Management chiefs believe there is a growing need for improved leadership and understanding in politics. They urge colleagues to give voice to opinions and advice as individuals in working for election of 'able people' and in fostering company programs aimed at grass-roots participation by employees

PAUL HOFFMAN, News Editor

Management leaders in chemical processing and allied industries believe it's time businessmen became "politically sophisticated."

They are shedding the cocoon of an historic hands-off policy with regard to politics, and are getting into the swim with enthusiasm and definite objectives.

Hesitancy toward things political which often characterized businessmen in the past through belief they would be accused of forming pressure groups is fast evaporating. Indeed, if the question "Should businessmen go into politics?" were asked 10 years ago, the chances are there would have been a healthy chorus of "No's."

But CHEMICAL PROCESSING found as the result of a survey of management leaders that today they are thinking the nation's problems are, for the most part, political and it's time they raise their voices in the political arena.

The survey was prompted by the growing size of the

wave of political action which has swept the U. S. business scene since the 1958 Congressional elections. And indications are that this wave will assume more towering proportions ere the Presidential race settles down in earnest next year.

How can businessmen play a militant role in politics? The Corrupt Practices Act bars their companies from taking sides on particular issues, from contributing funds, or otherwise supporting specific candidates and parties.

The answer is relatively simple: To help as citizens to put into public office the best qualified people; to assume responsibility of helping to mold public opinion by speaking out on matters which are calculated to do the greatest good for the greatest number; to foster "do-it-yourself" political action programs for employees.

Here's what some leaders contacted by CHEMICAL PROCESSING say about the businessman's role in politics.

'Our Problems Today Primarily Political'

THOMAS S. NICHOLS, Board Chairman, Olin Mathieson Chemical Corporation — A businessman is primarily a private citizen and has the same basic responsibility to his government as anyone else. But the very nature of his talents and abilities multiplies the degree of his responsibility.

I am not appealing to the businessman to enter politics as a counterweight to labor's expanded political operations. Neither am I asking for a new or revamped business pressure group. I am talking about businessmen entering politics in the broadest sense, not in terms of supporting one political party or simply to secure advantages for business.

My point is this: Our problems today—our country's and the Free World's—are primarily political. When we talk now of spheres of influence, we are referring to political, not economic influence. In a sense, it could be said that business is a tool in our cold war fight.

This is an era of ideological warfare. In this struggle, politics and business cannot be divorced.

What I hope to see is more of our businessmen thinking broadly about national and international questions and not being afraid to offer their

opinions and advice.

Moreover, businessmen should be readily on tap as consultants to government; they should be cheerfully available for a term of duty as a public official, and their firms should cheerfully cooperate; they should increase their intercourse with our political leaders through conferences and private conversations; they should take a more active interest in local politics on the theory that there is a very definite "trickle up" in public affairs and that their local actions can and do affect national actions.

'Participation Needed At All Levels'

A. R. MARUSI, President, The Borden Chemical Company, A Division of the Borden Company — Since the character of government is shaped by political activity, businessmen who expect sound legislation and efficient administration should be prepared to play an active role in politics. Their participation is urgently needed at all levels of government — from the township to Washington itself.

Political activity by businessmen is not the same as political activity by business. Corporations are prohibited by law from making financial contributions to political organizations, and partisan

activity by management is impractical in publicly owned companies whose stockholders represent divergent points of view. However, management can encourage—on a non-partisan basis—an interest in public matters and politics by employees, and, as individuals, members of management should participate actively in the party of their choice.

Both political parties stand to gain from the participation of people who are trained and experienced in business, and who can influence political action along lines of practical common sense that will in the long run benefit the people as a whole.

'Politics Is Not Instrument of Power'

CRAWFORD H. GREENEWALT, President, E. I. du Pont de Nemours & Company—Too often I am afraid that businessmen approach this delicate area (politics) more in anger than in reason, with an atmosphere of conflict about them.

Politics is not an instrument of power; it is, first of all, an instrument of persuasion, of communication. What one must remember is that the other elements in the economic system which are actively promoting their own causes have every right—and indeed every responsibility—to do so. The cue for business is to add its own song to the chorus.

Neither business as an institution nor business people as individuals can expect public support unless they are ready to let it be known what they stand for. Leadership rank comes only to those who show the capacity for leadership. This means the adoption of firm, positive, and affirmative doctrines readily associated with acceptable national objectives.

I am happy to endorse the principle of political participation by business people, for it is obviously essential that

their point of view, representing the largest and most widespread influence in our national life, should be clearly expressed.

'Corporation . . . Obsolete; Government . . . Absolute'

WILLIAM C. STOLK, President, American Can Company—If any businessman has not already been sold, he needs to be sold on the absolute need and urgency to participate in public affairs.

We businessmen, individually and collectively, have become much too refined for this day and age. We have striven too hard to seek universal acceptability for ourselves, as well as for our products. We have devoted too much effort toward attempting to find areas where we can agree with other business managers, with labor leaders, and with government. We have made too little effort to think about, and speak out on areas of disagreement with labor leaders, with government, and even among ourselves.

You, and I, and other businessmen, as corporate executives, must give more personal attention to our unique opportunity to exercise the art of leadership—to fulfill our unique responsibility as managers of human resources. As corporate executives we have great opportunity to demonstrate and promote sensible ideas and constructive actions for the common good.

You, and I, and other businessmen—as individuals—must, in order to be good leaders and good citizens, become politically sophisticated. We must, as individuals, personally participate in the job of helping to select, nominate, and elect able people to public office. If we fail to do so, we can look forward with certainty to the day when the corporation will become obsolete and the government will become absolute.

'All Must Share In Responsibilities'

E. E. FOGLE, President, Union Carbide Chemicals Company, Division of Union Carbide Corporation—We, as a nation, have assumed great, world-wide responsibilities—economic, political, and sociological. In a narrower sense, so has industry assumed many new obligations. A big industry, like a prominent citizen, must shoulder responsibilities.

It must, for example, accept the duties of leadership, many of which may well be onerous. And these responsibilities must be shared by all of us, as individuals.

'Businessmen Should Go Into Politics'

L. W. DAVIS, President, Metal Hydrides Incorporated—Businessmen by all means should go into politics, but not necessarily run for elective public office. The primary purpose of an executive is to make money for his company. And this, of course, requires intensive application of time and effort directly to the management of his business.

Too often overlooked, however, is the significance of the local, state, and national political climate in terms of the corporate objective of "making money." It is an integral responsibility of management, therefore, to be knowledgeable toward and active to some degree in the political arena.

Sometimes being active means assuming public office. For the most part, however, I feel government is a job for professionals. By providing financial assistance and business-oriented counsel to the party of his choice, the businessman can help nominate and elect the most qualified professionals.

Businessmen should welcome appointment to govern-

To bottom of page 180

LEADERS AIR VIEWS ON POLITICS

E. R. Baker



L. W. Davis

E. E. Fogle



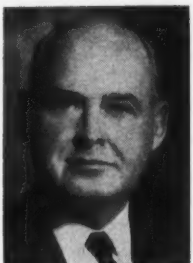
C. H. Greenewalt

J. R. Hoover



R. C. Hood

A. R. Marusi



T. S. Nichols

W. C. Stolk



Today Inside Western Europe's CPI . . . First in a Series

EURO-REPORT REVEALS WHAT'S HAPPENING IN...

- Research
- Common Market
- Technology
- Joint Ventures

JOHN C. VAALER, Editor



The Common Market—joint ventures of U. S. chemical companies with European counterparts—high rate of expansion—strong research programs—all these are keys to the future of the European chemical industry.

Such questions as: What is your feeling regarding the Common Market? What is your company's research program? At what rate is industry growing in your country? At what rate in your company? These and many other questions were posed to key people in the European chemical industry during a tour your editor made this summer.

Major interest was shown in the Common Market and its future. Some spokesmen revealed strong enthusiasm; others mixed feelings for its future.

Common Market

Although the Common Market organization is based upon economic principles, nevertheless it has its political overtones. It is the hope of many on the other side of the Atlantic that integration of

this bloc of free trade area ultimately may result in a thoroughly united Europe.

As one Frenchman, who is a firm believer in the Common Market and a united Europe, said:

"We French must learn to think as Europeans rather than as Frenchmen, and thus compete as Europeans."

Still another expressed confidence about the future, and showed great enthusiasm about possibilities of the Common Market.

It is expected that closer cooperation will be achieved once the program is in full swing with the French, Germans, Italians, and Benelux members working in close harmony. It will mean full expansion of all industry for 170 million people.

It is the hope of some that all 17 European countries will participate in the Common Market activity with fair trade to all. But the political aspects will be difficult to overcome. For example, Switzerland, although vitally interested in the chemical industry, has declined to join because of her traditional political neutrality.

Western Europe Survival

It is the feeling of some that the only way in which Western Europe can survive and attain world prominence is to have complete cooperation in the Common Market. The Russian Bear poses a strong threat to Western Europe, particularly West Germany. Mr. Khrushchev has made no bones about the Soviet Union's intent to expand her chemical processing industry.

So far balked in her attempts to obtain technique, know-how, and process licensing from the U. S., it is safe to assume that the masters of the Kremlin are casting covetous eyes toward Western Europe. Therein lies considerable of the fundamental theory needed for successful chemical processing. Assuming that the Russians' various Five- and Seven-Year Plans have been successful, it only follows that within Soviet boundaries there is the potential for technological applications on a scale somewhat approaching those of the United States.

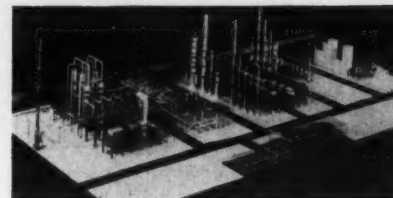
Despite the fact a number of problems are anticipated in the Common Market, there is strong feeling the 170 million people in the six-country unit offer a powerful basic market. Thus the potential basic market at home is important. Currently in Germany, the ratio of home market to export is 60 to 40 percent.

There is acute awareness of U. S. competition, but also there is the feeling our import taxes are too high. While wages are higher in the U. S., Europeans believe economies achieved by larger units and mass production tend to equalize lower wage rates in Europe and smaller production units.

Although the purpose of the Common Market is to make available for all member countries basic raw materials, nevertheless there is expansion of these facilities in some countries where these materials have not been available. For example, Holland is building its Kon. Ned. Soda



High temperature pyrolysis facility being built at main plant of Farbwerke Hoechst AG. in Frankfurt-Hoechst, West Germany. Unit, scheduled for completion late this year, will have a capacity of 100 million lb annually of acetylene and ethylene. Model (right) shows how facility will look when completed



Industrie N. V., Schaapslaan, Delft. This facility will provide a substantial supply of chlorine and caustic soda.

Joint Ventures

Many American companies have invested with European counterparts in joint chemical ventures. Among them are Esso, Monsanto, U. S. Industrial Chemicals, Shell, Cabot, Du Pont, U. S. Rubber, Phil-

tinental Carbon.

Cyanamid has announced it would commit \$13 million in capital to foreign ventures. Investment of nearly \$5 million of this is destined for formation of Cyanamid Italia, SpA., a manufacturing subsidiary. This brings to five the number of manufacturing facilities operated by the company and its affiliates within the Common Market.

Cyanamid's complete program calls for acquisition or construction by the company and its affiliates of nine manufacturing facilities to produce pharmaceuticals, specialty chemicals, and laminated plastics in seven countries.

Stauffer and Kali-Chemie AG., the latter operator of 15 plants in West Germany, have formed a joint company. Known as Kali-Chemie-Stauffer G. M. B. H., it will manufacture and market a special insoluble sulfur in Western Europe. A plant is being built in Hanover.

In the Benelux portion of

the Common Market, Continental Carbon is building a \$2.6 million carbon black plant. Located near Botlek, The Netherlands, the facility will have initial capacity of 15 million tons annually. It will be operated by a subsidiary, Continental Carbon Nederland, N. V.

Many European chemical companies are looking for American dollars. But some would prefer a joint venture in which process data and know-how are exchanged.

European chemical manufacturers historically kept technical knowledge under wraps, transmitting it only to foreign subsidiaries which were mostly wholly owned. But World Wars I and II changed their thinking. Many now are eager to share technique and know-how.

But it all adds up to the fact that some form of invest-

NEXT MONTH

More behind-the-scenes information on plant expansion, commercial development, market research, sales.

lips Petroleum, Reichhold, Rohm & Haas, and others.

Among recent moves by American companies into foreign and Common Market ventures are those made by Cyanamid, Stauffer, and Con-

Inside Western Europe's CPI From preceding page

ment is necessary by a U. S. chemical company interested in the European market. This is particularly true in basic materials; not so much so in specialties.

General Conditions

Chemical industry activity in Europe is on the rise—in some countries more than in others—and 1959 is expected to show a strong increase over 1958.

Although Europe was somewhat affected by the recession in the States in early 1958, the dip was not as pronounced as here.

In France, it appears the growth in '59 will be approximately 18 percent over last year. There is general optimism under De Gaulle's rule and strong belief in the new currency. The "grand design" appears to be taking form and the growth of the chemical industry in particular reflects progress in achieving success.

Using the 1952 production index as 100, it grew to 209 in 1958.

The West German chemical industry had its greatest increase shortly after 1952, but it still is growing at a good rate. Expected growth this year will be approximately eight percent versus 1958. This compares with a five percent growth for Gross National Product in that country. General economy there is very good, and employment is high. There is a shortage of skilled help since there are more jobs available than people. The country has the lowest rate of unemployment since World War II.

The Italian chemical industry is growing at the rate of 10 to 12 percent this year against 1958. However, the activity in plastics is much higher. This is expected to be 20 to 25 percent greater in 1959 than in 1958. The country's financial status is very good. There is plenty of currency and gold. One spokesman said the country stands second to West Germany. The reserve of \$2.6 billion dollars is in gold.

Raw-material Sources

Raw material is one of the most vexing problems of the West German chemical industry. The country's coal production rate will remain stable, and, generally speaking, electrical power supply will not expand too much. Thus she must rely on petroleum as a basis for expansion.

New pipelines are planned to boost petroleum supplies. For example, one is planned from Wilhelmshafen to Koln; another from Genoa through the Alps to Munich.

With the discovery of gas in the Pyrenees at Lacq, France has established a source of raw material supply which will be very helpful. Gas is rich in H_2S , and could yield more sulfur per year than the French chemical industry requires. Total sulfur production expected within the next two years is 1.5 million long tons—approximately 15 percent of the world's supply.

France also hopes when the Algerian situation is stabilized that raw materials from this source will greatly enhance her position.

As in the U. S., the growth of the chemical processing industry will depend upon availability and expansion of petroleum supplies.

Research

Research in Western Europe has been done more along general lines than in the States. For example, the rate of development of new chemicals in Western Europe is not as rapid as in the U. S. However, there is a gradual shift in this program so that the pattern will, to a great extent, start to follow our own.

Current research expenditures vary from $3\frac{1}{2}$ to 5 percent of the sales dollar. Much research has been done along the lines of processes and process improvement. For example, Phillips-Roxane at Amsterdam has developed a process for making insulin. Here the market was known and the product had been developed. Research, therefore, was directed toward developing a process to manufacture the product.

In general, research is being directed along the line of plastics, synthetic fibers, film, elastomers, fluorine chemistry, silicones, and metals.

In the past, research expenditures have not been too high. As a result, in Western Europe — there has been a lag in research activities. Cooperation with the U. S. will speed research. Synthetic fibers are an example along this line.

In France, particularly, there is cooperative research going on with universities both in the fundamental and applied fields. Most companies have active programs for expansion of research facilities in the form of new laboratories, more modern equipment, etc.

Although not new, a rather unusual service—known as Central Information Service—

is conducted by the patent division of Farbenfabriken Bayer. Its purpose is to disseminate information at low cost on new developments in the chemical industry, and this is provided in a fast and accurate way.

A system is used whereby material is condensed to high-light information on such topics as high polymers, organic and inorganic chemistry, general chemistry, dyestuffs, pharmaceuticals, textiles, etc.

The service has been in operation 45 years, and, to a degree, it parallels chemical abstracts.

The West German chemical industry cooperates by furnishing material of interest to Bayer's patent division. Many companies subscribe to the service which, I am told, is nominal in cost.

New Product Development

Five to seven years from "test tube to tank car" appears to be the length of time required to take a new chemical from its inception to commercial production. This, of course, parallels our experience.

Generally, however, the approach to introducing a new chemical is done on the basis of known potential users on a rather limited scale. Contrast this with our operations, where in some instances work is done on the "shotgun" rather than the "rifle" approach.

Chemische Werke Huls introduces about 12 new development chemicals yearly.

In the case of Bayer, approximately 40 percent of 1956 sales were accounted for by products not manufactured by it before 1948. In 1958, this proportion rose to almost 50 percent while 23 percent of sales were represented by products resulting entirely from Bayer's research and development work.

Although calcium carbide is providing the current source for acetylene in Western Europe, Farbwerke Hoechst has developed a process to pro-

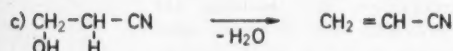
To page 184

A) Present large scale processes:

I Acetylene route

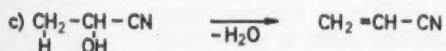


II Ethylene route (via Ethylene oxide)



B) The new process:

Ethylene route (via Acetaldehyde)



Comparison of conventional routes vs Knapsack acrylonitrile-from-acetaldehyde route



Castable crown being lifted in place on rebuilt glory hole

GORDON WEYERMULLER, Associate Editor
with **ORVILLE L. FREEMAN**, Designer
Indiana Glass Company, Dunkirk, Indiana



Orville L. Freeman, who designed and supervised construction of equipment at Indiana Glass

A HIGH-alumina castable suitable for 3000°F temperature has recently been used for a number of applications at Indiana Glass Company with considerable success.

Glory Holes

First application for which the high-temperature castable was used was for glory hole caps. Clay caps formerly used lasted about 10 weeks before requiring replacement. It was decided to try the castable to see if life of cap could be lengthened.

Caps made from castable were designed with a higher rise in crown, permitting temperature to be increased from 2400 to 2700°F, which was desirable for process. Hence, castable cap weighs 1400 lb,

being somewhat heavier than clay cap.

Even with the extra weight, castable caps last from four to six weeks longer. Service life of 14 to 16 weeks is excellent in view of severe conditions which must be withstood. Although operating temperature is 2700°F, temperature of glory holes may drop as low as 100°F during weekend shutdown. It is then blasted back to full heat within two hours.

Big advantage of castable caps is availability. A cap made from castable can be ready for use in three days, whereas the clay caps must be ordered at least six to twelve weeks in advance. Cost of labor and material for castable cap is about two-thirds that of one made of clay. This is after form has been supplied, which can be used over and over.

Unit Melter

After being successfully used for glory hole caps, high-alumina castable was used to construct the refiner crown for 16-ton continuous unit melt-

Castable crown on unit melter (background) is still as good as new after three months' severe service

Glass plant finds that use of high-alumina castable for glory hole caps lengthens their life, cuts costs, and has big advantage of ready availability. High-temperature castable has also been found to be an asset when used for floors under ovens, doors for ovens, baffles, and crown on melter

er. This melter has been in production on milk glass. Fluorite conditions present with this type of glass are considered to be bad on most refractories. After three months of this tough service, the castable crown looks as good as when it was placed in operation.

Floor Under Oven

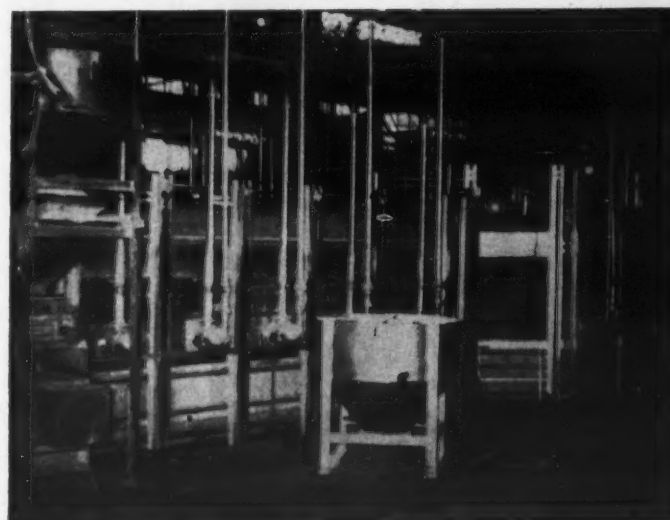
Plant uses a mold oven with flat-steel, four-wheeled trucks, which run in channel iron embedded in floor. This

is a two-cart oven which heats to 1200°F.

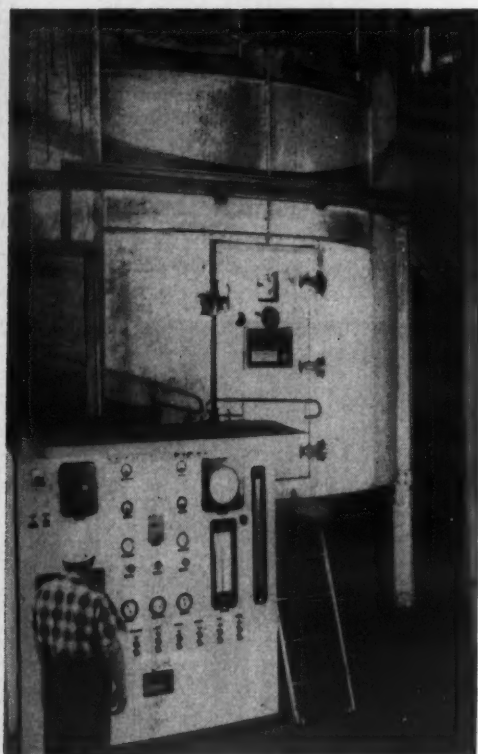
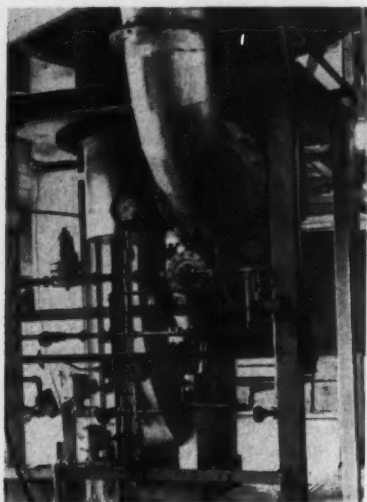
When floor went bad, instead of cutting firebrick to lay track, plant proceeded to embed in castable. Oven was not completely cooled and it was necessary to work material into place as quickly as possible. After three months of service — with the heavy carts filled with molds being shoved in and out many times — floor is as good as when it was first installed.

Doors for ovens have been

To page 36



High-efficiency burner provides heated air to spray dryer. Steam atomization of oil permits quick startup



Controls for the big spray dryer are mounted on single, centrally-located panel. Access door on dryer (rear) facilitates cleaning and inspection

Processing byproduct sulfite liquors into useful products continues to gain momentum. Lignosol Chemicals has just completed a \$1 million expansion program to more than double its output. Boasting one of the biggest spray dryers in the business, flat-bottom unit . . .

Spray Dries 140 lb/min Sulfite Liquors

TED F. MEINHOLD, Associate Editor
with **J. K. RUSSELL**, Assistant General Manager
Lignosol Chemicals Limited

Use of the word "waste" is gradually disappearing in references to pulp mill by-product sulfite liquor. The formerly troublesome, hard-to-get-rid-of material has risen in stature to the point where it is now regarded by many as a valuable raw material.

Products being made from it are finding widespread use in chemical, ceramics, cement, tanning, oil well drilling, and other industries. The number

of companies processing the material is growing. Plant capacities are already being boosted to keep up with rising demands for the end products.

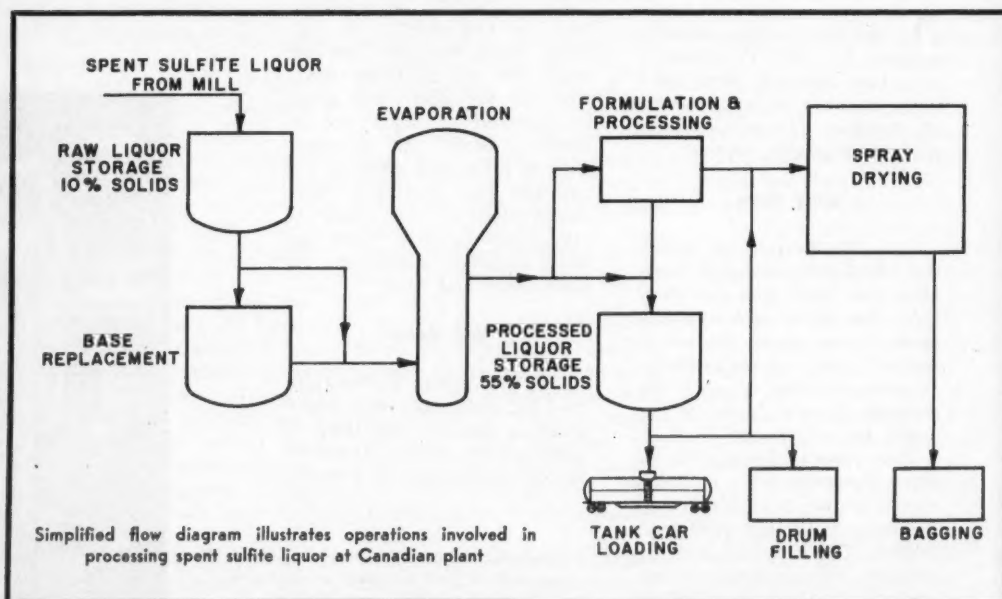
One of the pioneer firms in the field is Lignosol Chemicals Limited, Quebec, Canada. Formed in 1950 by a group of Canadian paper companies, Lignosol has just finished increasing its production capacity from 30 to 80 tons powdered product per day. The

plant makes about a dozen different products from sulfite liquor. All are produced in a spray-dried form.

Boast Giant Spray Dryer

The latest production capacity boost was achieved by installing one of the biggest spray dryers in the business — a 50 ton per day flat-bottom unit. The addition brings the total number of spray

To page 36



Union Carbide Finds Many Uses For Silica Refractory-Insulation

Plant has moved swiftly to take advantage of unusual properties of recently developed foamed, cellular material for such applications as — providing fire protection for low-temperature vessels — preventing stress corrosion cracking of stainless steel — and lining stacks and vessels in critical applications

GORDON WEYERMULLER, Associate Editor
and W. C. TURNER, Staff Engineer
Union Carbide Chemicals Company
Div. of Union Carbide Corporation
South Charleston, West Virginia

Although it was only available commercially a little more than a year ago, a silica glass insulation, known as Foamsil, has already helped Union Carbide Chemicals solve a number of difficult problems. The foamed, fused silica material is used in the South Charleston plant where its properties can be of advantage.

Properties

Foamsil is foamed, fused silica glass. It is about 99% silica, having about the same composition as the gem, opal. Material is resistant to all acids except hydrofluoric and hot phosphoric. Because of its closed cellular structure, it is also resistant to vapors and liquids. Material is combustible.

Product has satisfactory insulating properties, thermal conductivity for 11 lb/cu ft density being as follows: K value in Btu/sq ft/hr/°F/inch at mean temperature of 100°F is 0.48; at 500°F, K is 1.0; at 900°F, K is 1.85.

Foamed silica is suitable for use at cyclic temperatures

varying from -450 to 1600°F and up to 2200°F continuous temperature. Resistance to thermal shock is excellent. It has relatively high compressive strength, of 200 lb/sq inch.

Applications where the silica material has been used at Union Carbide have been those where one or more of the foregoing properties could be used to advantage. Some of these applications follow:

Fire Protection

In several instances critical fire protection requirements for low-temperature vessels had to be met. Additional safety was desired over and above that which could be obtained by the standard method of insulating such vessels with cellular glass material called Foamglas.

These vessels were insulated in the customary manner. Over the outer layer of cellular glass, a fire-protection layer of foamed silica insulation was added. The foamed silica protects the cellular glass from thermal shock. It is estimated that this com-



Special mortars must be used in fabricating foamed silica

bination of materials will provide a minimum of three hours of fire protection for the vessels.

Most mass types of insulation will cause stress-corrosion cracking of austenitic stainless steel due to salts in their composition. Since the foamed silica insulation does not contain these salts, it can be used to advantage over stainless.

At Union Carbide the foamed silica insulation is used on stainless steel vessels and piping where high temperatures or thermal shock dictates use of a mass insulation. There has been no evidence of stress corrosion cracking wherever the foamed silica insulation was used.

Non-absorbent Insulation

In many instances materials in piping or vessels are hazardous because of their being flammable or toxic. In case of a leak, an absorbent insulation

will become saturated. Thus, an insulation which will not absorb fumes or liquids is necessary for safety reasons. Since foamed silica is composed of completely closed cells, it does not absorb vapor or liquid. It cannot become saturated with a combustible or toxic vapor or liquid.

Lining of Stacks

Problem of insulating stacks is one of importance, and its solution is difficult. Although stacks serve various purposes, most stacks are for the purpose of moving fumes of combustion. These fumes are acidic and condense at high temperatures.

Since condensed acids are detrimental to stacks, it is desirable that the temperature of fumes in stack be maintained above the dew point of the acid content of the gases. This results in an extremely high vapor pressure. There-

To page 39

Big electrostatic precipitators at St. Regis Paper handle 400,000 cu ft wet gas per minute. Expected to pay out in only 3½ years of operation, units . . .

• Prevent Air Pollution • Recover 75 Tons Salt Cake per Day

TED F. MEINHOLD, Associate Editor
with LLOYD E. GOODWIN
Pulp Mill Superintendent
St. Regis Paper Company

Problem: When St. Regis Paper Company decided to quadruple the production of its Jacksonville, Florida, kraft sulfate mill, engineers knew that they would also have to do something about the increased dust load and odors that would emanate from the plant. Existing facilities operated satisfactorily, but were not big enough to handle the additional volume.

Air pollution control requirements were rigid — especially since the mill was located only a stone's throw from the Jacksonville municipal airport.

Paper output was to be boosted from 300 to 1300 tons per day. When expansion program was completed, there would be a total of three recovery boilers burning about five million lb of black liquor per day, containing 65-67% solids (33-35% water content as fired to furnaces).

Volatilized salt cake (sodium sulfate) in the hot flue gases condenses into solid dust particles when gases are subsequently cooled, and can be recovered for reuse in pulping process. Flue gas output would be approximately 400,000 cu ft of wet gas per minute having dust loading of 1.5-1.8 grains per cu ft.

Solution: Based on successful experience with previously installed units, company selected two electrostatic precipitators to handle the in-

creased dust volume. This boosted total number of units at the mill to four.

Precipitators are flat bottom, double-chamber units. Each precipitator measures about 30 x 28 x 27 ft high. There are two gas inlets and two outlets in each unit. Dimensions of these ducts are approximately 13 x 16 ft.

Each chamber is, in effect, a separate precipitator. By means of slide gates, ductwork, and electrical equipment, it can be by-passed,

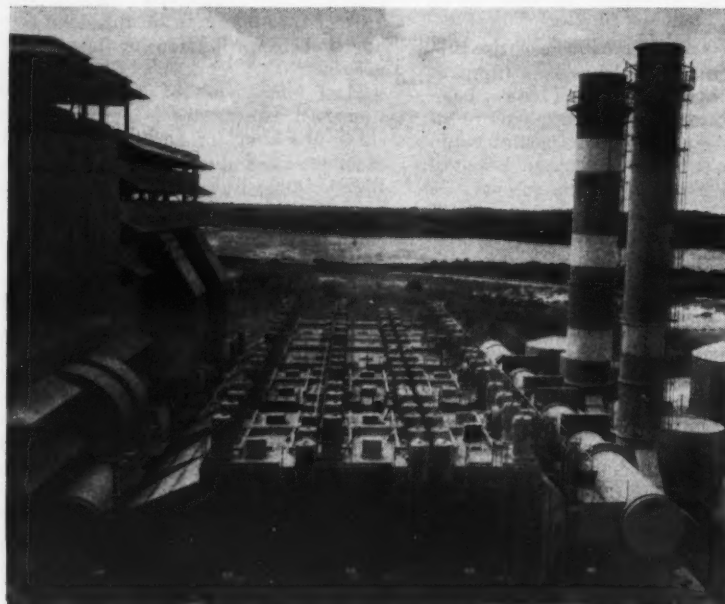
closed off, and opened for service and maintenance while adjacent chamber carries full dust load.

Each chamber has three separately-energized fields. The field is a section of the unit with gas passages or ducts bounded by flat steel collecting electrodes 16 ft high. Stainless steel wires in tubular supporting frames are mounted midway between pairs of collecting electrodes.

Separate power supply is furnished for the inlet, the

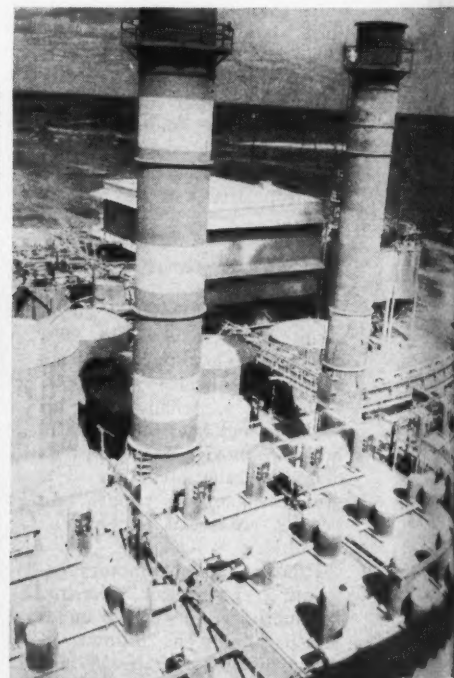
center, and outlet fields. With separately energized fields, higher voltages are impressed upon the outlet fields and higher efficiencies gained, because of lower grain loading, as result of gas cleaning in preceding fields.

Also, with separately energized fields, one field may be isolated and the remaining fields carry the load until some convenient opportunity



Four big double-chamber electrostatic precipitators at St. Regis Paper handle 400,000 cu ft wet gas per minute

Photos by CP Staff



Looking down on one of the precipitators. Housings for suspension insulators supporting the 16' long electrodes can be seen on roof of unit. Tall stacks are part of black liquor recovery boilers

for servicing presents itself. Gases flow horizontally through the unit from the inlet to the outlet through these fields or precipitation zones.

Shell of precipitator is made of hollow glazed tile reinforced internally with steel and concrete. Roof is constructed of reinforced concrete with tile facing on underside.

Discharge wires, collecting electrodes, and gas distribution plates are rapped periodically by timer control pneumatic rappers. This dislodges collected salt cake. Material falls into collecting chamber beneath precipitation zones. Drag-chain type scrapers move collected product to sluice hopper located at inlet end of chamber.

Results: The electrostatic precipitators are handling the increased dust and fume loads without difficulty. Performance tests have shown units to be 98% efficient. Sodium sulfate recovered by precipitators amounts to over 75 tons per day. Chemical cost savings thus realized are expected to pay for the equipment in another two years. Precipitators have been in operation for about 1½ years.

Except for some minor maintenance problems, the units have been operating satisfactorily. Precipitators are so arranged that any three of the four can handle the total dust load. This permits one unit to be used as a spare, placed in standby, ready for immediate duty if another requires servicing.

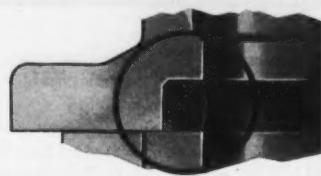
(Electrostatic precipitators are manufactured by the Metal Products Division of Koppers Company, Inc., Baltimore 3, Maryland.)

Check 1024 opposite last page.

NEXT MONTH

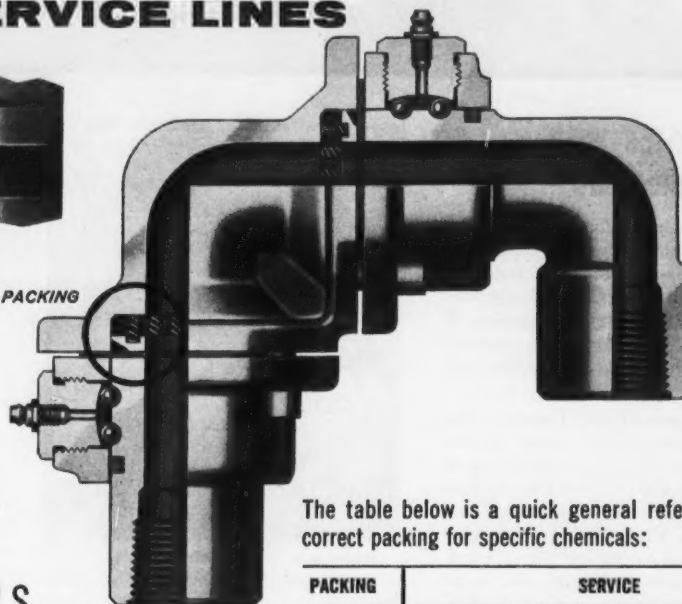
Solids fluidization as applied to limestone calcination is paying dividends at New England Lime Company. Details are revealed in article appearing in November CP's New Solutions section.

NEW **CHIKSAN** SWIVEL JOINT GIVES SAFE, LASTING FLEXIBILITY TO CHEMICAL SERVICE LINES



VIEW ABOVE SHOWS MOLDED PACKING

VIEW AT RIGHT SHOWS DISC PACKING



**INTERCHANGEABLE
PACKING FEATURE
ENABLES DS SERIES
TO HANDLE A WIDE
RANGE OF CHEMICALS
IN SERVICES FROM -65°F
TO +400°F AT 300 PSI**

The DS Series swivel joint with its broad service range can be a valuable new tool in your process system. Use it in chemical loading of tank car or tank truck, for stress relief in piping subjected to vibration, expansion or settling, or as a steam rotation connection between stationary and revolving equipment. Wherever you use it, you'll find it pays for itself in extended service life.

Using a disc or molded type packing, this swivel joint can be applied to handle steam and any of a wide variety of chemicals processed in your plant. And the split segment feature of the DS Swivel Joint allows replacement of packings without removing the joint from the line.

Buy and apply Chiksan DS Series Swivel Joints for chemical service lines in your plant now. You can select from eight basic styles for full rotation in one, two or three planes. For more information write to Chiksan or fill in the coupon below.



The table below is a quick general reference for the correct packing for specific chemicals:

PACKING	SERVICE
Neoprene	Recommended for alkaline and acid salt solutions and aldehydes such as formaldehyde.
Hycar	These should be used for petroleum derivatives, neutral or slightly acidic salt solutions, dilute acids (Sulfuric to 50%, Hydrochloric and Nitric to 20%), alcohols, glycols, ethers, gases (Oxygen not over 500 psi), and vegetable oils.
Butyl	Recommended for liquid or anhydrous ammonia, gases (except oxygen over 500 psi), ammonia derivatives such as hydrazine and for certain hydraulic fluids such as Pydraul, Skydrol, and Cellulube. It is recommended for acetone and methyl ethyl ketone.
Teflon*	Used for concentrated or fuming acids and other highly oxidizing fluids, esters, aromatics, liquid chlorine, bromine and fluorine if temperature is not excessive.
Asbestos	For use in saturated steam service.
Viton "A"	Recommended for use with concentrated acids, aromatics, liquid chlorine, liquid bromine, chlorine or bromine derivatives, molten sulfur, and carbon disulfide.
Metallic	For extreme services such as hot gas at 600°F., a Stainless Steel metal disc, specially treated to prevent galling, is recommended.

* R.T.M. DU PONT

CHIKSAN COMPANY, 330 North Pomona Ave., Brea, California

Please send me copy of Bulletin No. 1258

Name _____
Company _____ Title _____
Address _____
City _____ Zone _____ State _____

CHIKSAN 

A SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION

CHIKSAN COMPANY—Brea, California • Chicago 5, Ill. • Newark 2, N.J. • Weco (Division), Houston 24, Texas • Subsidiaries: Chiksan Export Co. • Chiksan of Canada Ltd.

Check 1025 opposite last page.

Progress Report...

New chelates with 2,4-pentanedione

Metal chelates provide a means of deactivating or modifying the properties of a metal ion. Effective chelating agents with many industrial applications can be formed by the reaction of CARBIDE's 2,4-pentanedione (acetylacetone) with numerous metals and oxides.

Pentanedione, or acetyl acetone, usually forms oil-soluble metal derivatives, whereas most other chelates are water-soluble. Certain of these chelates may have possibilities as fungicides, insecticides, driers for paints and varnishes, and colors for inks. Titanium pentanedionate is indicated as an excellent cross-linking agent for cellulose-derivative films and coatings giving them high solvent resistance.

lose-derivative films and coatings giving them high solvent resistance.



Here are some other ideas . . . By adding a small amount of 2,4-pentanedione to a water solution of a coating-

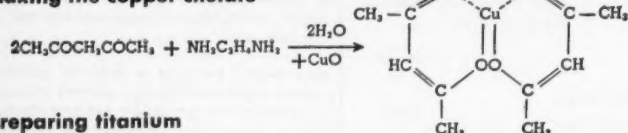
metal salt, hard and bright films can be laid on baser metals without an electric current. The discoloration of cyclic carbonate spinning solutions of acrylonitrile polymers can be inhibited by adding 0.1 to 3.0 per cent 2,4-pentanedione to the solution. Butadiene may be copolymerized with 2,4-pentanedione to produce an improved grade of synthetic rubber, suitable for industrial uses. A granular, water-insoluble, anion-active resin can be made with 2,4-pentanedione as the reactive ketone. The soluble metal derivatives of 2,4-pentanedione should be evaluated for their ability to increase the efficiency of internal combustion engines when added to lubricating oils.

Remember, CARBIDE's 2,4-pentanedione is fully miscible with most organic solvents. Its molecular weight of 100.1 also makes it interesting as an intermediate. For more information a technical bulletin containing many suggestions for applications of CARBIDE's 2,4-pentanedione is available. In it are listed physical properties, specifications and shipping information. For information on other CARBIDE chemicals, write for the 1959 Physical Properties of Synthetic Organic Chemicals—a comprehensive description of the properties and applications of more than 400 CARBIDE chemicals. Please write to Dept. HP, Union Carbide Chemicals Company, 30 East 42nd Street, New York 17, N. Y.

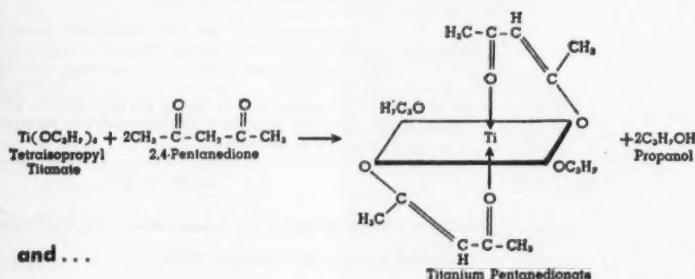
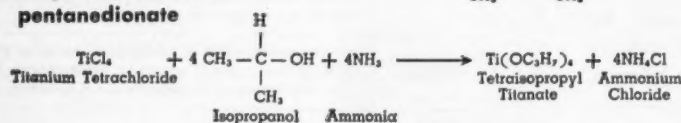
"Union Carbide" is a registered trade-mark of Union Carbide Corporation.

PENTANEDIONE CHELATES

Making the copper chelate—

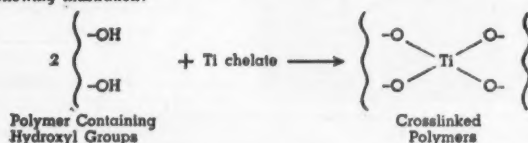


Preparing titanium pentanedionate



and . . .

The crosslinking effects of this material on a cellulose derivative polymer may be shown by the following illustration:



Check 1026 opposite last page.

NEW SOLUTIONS

Alumina Castable

From page 31

made from the castable and are exceedingly strong. They can be made of any size or shape.

Plant has also used castable to fill a section which serves as a baffle on a glazer. After two weeks of severe glazer heat, this section looked good enough so that plant is fixing five sections (full glazer) with castable. Cost of material is one-third that of refractories and labor one-fifth.

(H-W High-Alumina Castable is product of Harbison-Walker Refractories Company, 307 Fifth Ave., Pittsburgh 22, Pennsylvania.)

Check 1027 opposite last page.

Spray Dryer

From page 32

dryers in the plant to three. The recent \$1 million expansion program is expected to pay out in about three years.

The flat-bottom dryer design was chosen because of minimum space occupancy, ease of operation, and simplified maintenance. Unit is made of mild steel and has a 24' diam chamber.

Feed rate is approximately 140 lb 50% solids material per minute. Some products, which are heat sensitive, are fed at a lower rate — 70 to 80 lb per minute. Inlet air temperature varies from 500° for most products down to 400°F for heat sensitives.

Outlet temperatures range from 250° to 270°F. Retention time is a matter of seconds. Moisture of final product runs between 2 and 4%. Prior to being discharged, product is cooled by a cold air stream introduced through an air sweeper. Exit temperature is about 140°F.

Direct-drive Atomizer

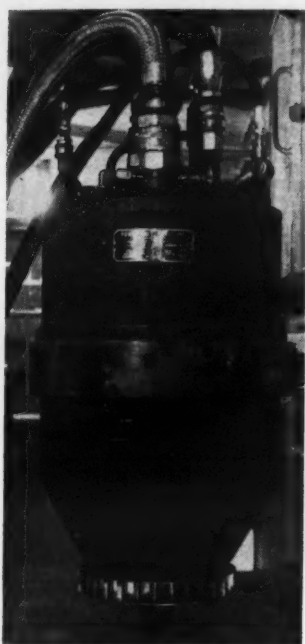
Dryer's atomizer assembly is located at top of unit and consists of a high-frequency

UNION
CARBIDE
CHEMICALS
COMPANY

UNION
CARBIDE

motor with a multiple-vane atomizer wheel mounted directly on motor shaft. There is no other belt or gear drive involved. Atomizer speed is 12,000 rpm. Power is supplied to atomizer motor by frequency converter driven by 40 hp motor. Atomizer speed may be changed by changing drive sheaves on frequency converter.

Air used in dryer is heated by means of a direct-fired burner fueled with Bunker C oil. Fuel consumption is about 30 imperial gal per ton of



Closeup of spray dryer's atomizer assembly. Note multi-vaned atomizer wheel at base. Wheel revolves at about 12,000 rpm

finished product. Heating value of oil runs about 18,000 Btu per pound.

Recovery of product from exit air stream is accomplished by two cyclone collectors each of which is followed in series by a tube-type collector. Each of the latter has 168 tubes. Recovery is better than 99%.

Normal screen tests are 75% retained on 200 mesh. On some products, this may drop to 60% and on others increase to 85 or 90%. Bulk densities range from 25 to 40 lb per cu ft. The pH varies

INTEGRAL POSITIONER
Transfers a greater volume at higher pressure with more sensitivity than any other positioner.

POWERFUL CYLINDER ACTUATOR
Uses high pressure, small volume for utmost in speed and positive positioning.

EXCLUSIVE PISTON LIPSEALS
Bubble-tight sealing and sensitive positioning.

CAST ALUMINUM YOKE
Extra strong; cannot rust.

VARIETY OF BODY MATERIALS
Available in steel, bronze, ductile iron, and all castable alloys; extra thick body walls meet 600 lb. ASA Rating.

SEPARABLE OR INTEGRAL FLANGES
Integral type meets ISA Face-to-Face Dimensions.

SINGLE SEAT BODY DESIGN
More effective flow control; less cavitation and erosion.

LIFT-OUT SEAT RING
Quick replacement feature saves time and labor costs.

- Guaranteed tight shutoff at any pressure or temperature
- Simplified construction means less maintenance and fewer replacement parts
- Quick delivery in all sizes 3/4" thru 6"
- Available in straight-thru, three-way and angle design; also with hand-wheel actuators, manual override, radiation fins and other optional features

Partial List of Conoflow LB Valve Users:

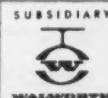
ALUMINUM CO. OF AMERICA
AMERICAN CAN CO.
ARMOUR & CO.
ARMSTRONG CORK CO.
ATLAS POWDER CO.
BETHLEHEM STEEL CO.
CROSSETT PAPER MILLS, INC.
CROWN-ZELLERBACH CORP.
DOW CHEMICAL CO.
GENERAL FOODS CORP.
HAMMERMILL PAPER CO.
HERCULES POWDER CO.
JONES & LAUGHLIN STEEL CO.
KIMBERLY-CLARK CORP.
OLIN MATHIESON CHEM. CORP.
MERCK SHARP & DOHME
PABST BREWING CO.
REYNOLDS ALUMINUM CO.
JOS. SCHLITZ BREWING CO.
SCOTT PAPER CO.
SEAGRAM DISTILLERS CO.
E. R. SQUIBB & SONS
UNION CARBIDE CORP.
U. S. RUBBER CO.
U. S. STEEL CORP.
WEYERHAEUSER TIMBER CO.

USERS FROM COAST TO COAST SPECIFY "CONOFLOW LB VALVES for Automatic Control that's Headache-Proof"

When company after company switches to Conoflow LB control valves—and constantly reorder—there must be a reason. Leading manufacturers use Conoflow LB valves because they want headache-proof control—and they get it. Specify Conoflow LB valves for performance, economy and dependability—*complete* satisfaction. For additional information telephone your Conoflow representative (located in principal cities); or write to Conoflow Corporation, 2100 Arch Street, Philadelphia 3, Pa. for Bulletin LB-3.



CONOFLOW CORPORATION
FOREMOST IN FINAL CONTROL ELEMENTS



Check 1028 opposite last page.

For SPEED, SIZE, SAVINGS and SAFETY

FLETCHER

SUPER CENTRIFUGALS



FLETCHER ELECTRO-NUMATIC BRAIN

Eliminates all possibility of human error. Assures perfect performance. Completely safety interlocked. Cuts labor costs 100%.

Regardless of how intricate the schedule of centrifugation, the Fletcher Electro-Numatic Brain thinks it through all the way.

FLETCHER PILOT PLANT CENTRIFUGAL



Rugged, compact machine combines functions of extractor, separator and clarifier. Results from this test unit can be accurately scaled up to production unit.

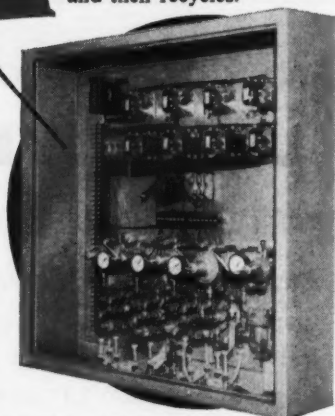
SOLVE YOUR PROBLEMS

Call on Fletcher to solve your toughest problems in centrifugal engineering.

For example, this super-suspended centrifugal—the Fletcher Super-S-Omatic broke through the speed barrier. Until it was developed, no centrifugal of this size existed that achieved 1600 RPM = 1750 G's.

This Fletcher centrifugal, with a gravity of 1750 G's, is coupled with a production rate of 16 cubic feet per batch. This unit is capable of 6 production cycles per hour.

The Fletcher Super-S-Omatic features infinite variable speed by fluid mechanical drive. It's completely automatic—at the touch of a button it automatically starts, feeds, skims, brakes, unloads and then recycles.



WHEN in Philadelphia Visit The Fletcher Operating Centrifugal Exhibition.

ASK ABOUT THE FLETCHER RENTAL PLAN

The Fletcher Division Of THE SHARPLES CORPORATION

2300 Westmoreland Street • Philadelphia 40, Pa.

Send me additional information on the Fletcher Centrifugals.

NAME & TITLE

ADDRESS

COMPANY

CITY & STATE

Check 1029 opposite last page.

NEW SOLUTIONS

Spray Dryer

From preceding page

between 4.5 and 6, depending upon product involved.

Pipe-line Delivery

Lignosol's raw material is a calcium lignosulfonate in a highly diluted solution. The liquor arrives via pipeline from the nearby Anglo Canadian Pulp and Paper mill. Upon reaching the plant, the product is converted as required to ammonium or sodium base prior to evaporation. Change of base is carried out by means of a sulfate precipitation process.

A solution containing 50 to 55% solids is obtained after treatment in a thermal compression evaporator. Additional modifications are made on the concentrated solution in order to develop properties required for specific end use. This would include such operations as sugar removal, etc. The treated concentrated product is what is fed to the spray dryers.

Good Dispersing Agents

Company markets final products under the tradename Lignosols. The materials have excellent dispersing qualities which are reported to be useful in a wide variety of slurry systems. Products also possess good adhesive and binding properties. They are very effective in tanning processes where their ability to combine with hide protein improves the leather.

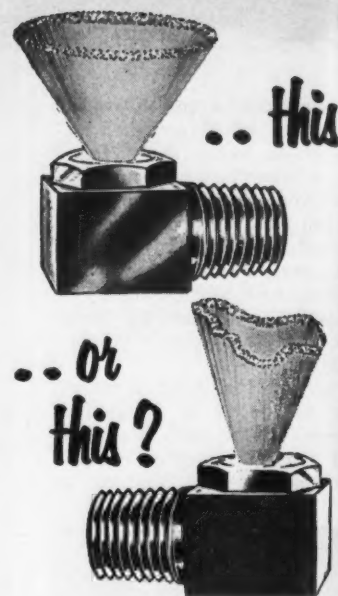
Products vary in color from a light buff to a dark brown. All are soluble in water and hygroscopic to a certain degree. Materials are stable at normal temperatures.

(Spray dryer was engineered and constructed by Bowen Engineering, Inc., North Branch, N.J.)

Check 1030 opposite last page.

(Further information about Lignosol chemicals may be obtained from Lignosol Chemicals Limited, PO Box 2025, Quebec, Canada.)

Check 1031 opposite last page.



BE SURE OF A PERFECT CONICAL SHAPE SPRAY ALL THE TIME WITH Monarch

For a perfect spray, many plants prefer Monarch nozzles.

These advance design nozzles reduce clogging and guarantee dependable applications to...

- ACID CHAMBERS
- AIR WASHING
- CHEMICAL PROCESSING
- COOLING PONDS
- DESUPERHEATING
- GAS SCRUBBING
- HUMIDIFYING
- SPRAY DRYING

Send for catalog 1

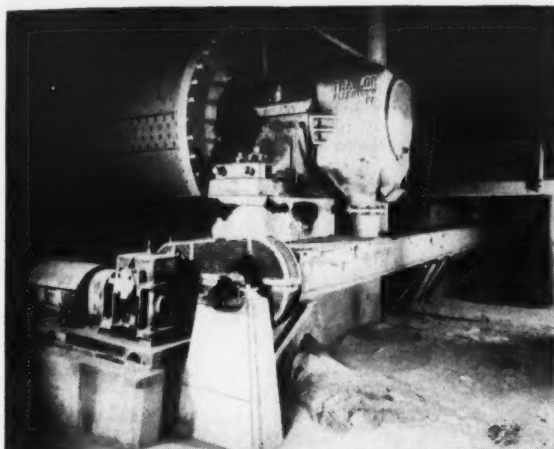
Monarch
MFG. WORKS, INC.
3403 GAUL STREET
PHILADELPHIA 34, PA.

Check 1032 opposite last page.

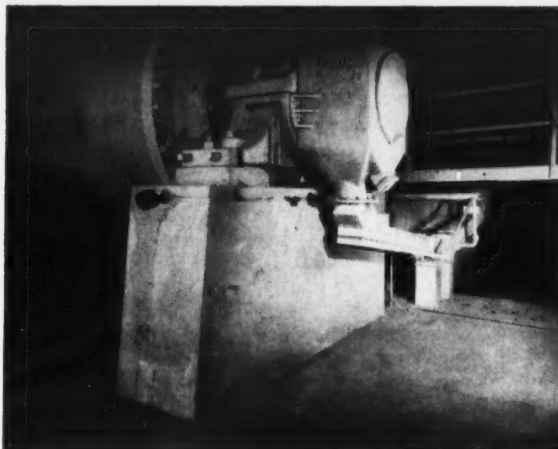
CHEMICAL PROCESSING

The Arithmetic of Materials Handling

See our exhibit at Chem Show
New York Coliseum
November 30-December 4



BEFORE: Dirt, noise and mechanical breakdown were constant problems in this cement plant, where two mechanical conveyors were used to collect raw materials. A 5 h.p. motor driving auxiliary equipment wasted valuable space and power, required frequent maintenance. Spillage clean-up wasted costly man-hours.



AFTER: Clean, simple, quiet. Notice the difference two 8" F-H Airslide® fluidizing conveyors have made. No dangerous moving parts. Nothing to lubricate. Auxiliary equipment and foundations are gone. Power needs are now only $\frac{1}{8}$ of previous needs. Fluidizing saves wear and maintenance.

AIRSLIDE® Fluidizing Conveyor minimizes material loss . . . maintenance . . . moving parts

If you are now handling dry, pulverized materials, the F-H Airslide Fluidizing Conveyor can help you stop noise, and air-pollution, as well as speed flow and reduce maintenance cost.

Simplicity Itself

F-H Airslide conveyors fluidize dry, pulverized materials with low pressure air.

These materials literally flow at high speed, down the inclined conveyor. Power requirements are small.

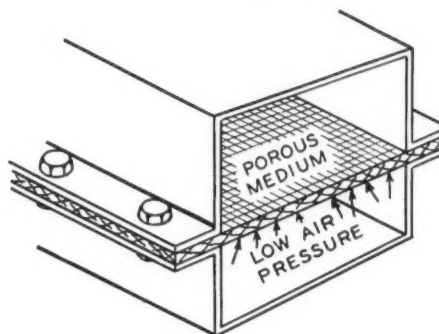
Flexibility, Low Cost

For unlimited applications, Airslide conveyors take up little space, and can be used singly and in combination with other Fuller pneumatic conveying systems. The movement of fluidized material can be around corners, between floors, through walls—nearly any conveying distance.

Better Housekeeping

Can Fuller conveying systems help eliminate your housekeeping problems—cut your maintenance and handling costs? Write today, outlining your problem in handling dry, finely-divided materials. Fuller will gladly make appropriate recommendations.

"Pulverized Materials Flow Like Water!"



FLUIDIZING PRINCIPLE: Porous supporting medium divides conveyor section into two "compartments". Dry material flows down inclined conveyor, fluidized by low-pressure air entering beneath porous medium.



FULLER COMPANY

136 Bridge St., Catasauqua, Pa.

SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
Birmingham • Chicago • Kansas City • Los Angeles • New York • San Francisco • Seattle

"See Chemical Engineering Catalog for details and specifications".

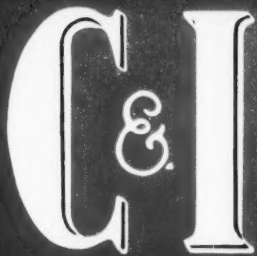
Check 1033 opposite last page.

C&I designed plants...

Today, C&I designed plants are operating successfully in many major areas of the world, and more are continually being developed. In fact, the world over, C&I's complete engineering and construction facilities are at work for the steadily growing chemical and fertilizer industries. C&I is well equipped to handle these projects in detail, from preliminary planning, cost analysis, market research, engineering, design and construction -- to the completed installation. These modern plants are constructed to rigid specifications and the over-all efficiency and capacities are guaranteed.

If you are considering expansion of present facilities, or the establishment of a new location, it will pay you to consult C&I.

Representatives in principal cities throughout the world.



®

the chemical and industrial corp



available world-wide



Nitric Acid

(High Pressure, Self-sustaining)

Concentrated Nitric Acid

(98% -100% HNO_3)

C & I Spherodizer Process

(Pelletizes solutions and slurries)

Prilled Ammonium Nitrate

Ammonium Nitrate

(C & I Short Tower)

Nitrogen Solutions

Complex Fertilizer

(PEC Process)

Phosphoric Acid

(Prayon Process)

Sulfuric Acid

Ammonium Phosphate

Oxygen

Fume Eliminator

Oil Absorber

Existing plants designed and constructed by C & I are represented here by the flags throughout the world. Due to the Earth's curvature, some of the plants cannot be shown.

Corporation • Cincinnati 26 • Ohio

How would you handle an abrasive slurry that erodes metal pumps within *minutes*?

Such a slurry was the problem of Sylvania Electric Products Company at its Danvers, Massachusetts plant.

Extremely abrasive phosphor particles in xylol solution—used to coat the inside of fluorescent lamp tubes—created a tough pumping job: pump life was brief, maintenance heavy, contamination and discoloring a constant problem.

After experimenting with a pneumatic system to handle the material—which proved too costly—Sylvania engineers tested a Goulds-Pfaunder Glassed Pump on the job.

Periodic examination over the course of the last two years revealed no wear and no foreseeable difficulties in the future!



Three more Goulds-Pfaunder Glassed Pumps have since been installed, each of the four running approximately 16 hours a day, 5 days a week without difficulty. Each handles 30 GPM at a head of 30 ft.

Ends product contamination. Because glass is inert and all surfaces of the pump coming in contact with the pumpage are glassed, there is no contamination of the slurry.

Eliminates flammability hazard. With these pumps the system is completely enclosed. Hazardous vapors are not exposed to the atmosphere as they were with the particular pneumatic system used previously.

Reduces production costs. This pumping system does away with the costly pressure vessels, pipes, controls, overflow protection system and the need for a full-time operator required by the pneumatic system. Thus, production costs are lower.

Easy to inspect. Inspection of equipment is simple, fast. Goulds-Pfaunder Glassed Pumps can be inspected just by removing the casing cover,



One of four Goulds-Pfaunder Glassed Pumps at Sylvania Electric Products Co. plant at Danvers, Mass.

without disturbing pipe connections.

Goulds-Pfaunder Glassed Pumps may be the answer to *your* tough slurry-handling problem. Write for free descriptive bulletin to: Goulds Pumps, Inc., Dept. CP-109, Seneca Falls, N. Y.

GOULDS PUMPS

Check 1035 opposite last page.

From page 33

fore, the vapor attempts to reach the lower pressure of the air surrounding the stack by passing through the stack wall. Stack linings should be vapor resistant, acid resistant, and have good insulating properties. Foamsil meets all these requirements, thus is used for this service.

In the design of stack linings, however, it is not a simple matter of just fitting the foamed silica glass within a stack. The material must be so installed as to provide a vapor-resistant inner wall which will not be cracked or broken by the movement of the outer stack wall.

It is a problem to design two independent walls having different expansion coefficients, temperatures, and physical loadings, and still maintain a vapor-resistant inner wall combined with an outer wall of little vapor resistance. One critical stack in the South Charleston plant has been so lined.

Foamed silica has been used in the plant as an internal insulation in tanks, reactors, and piping. Most of the applications have been in sulfuric acid service in the range of 65 to 95 percent acid. There is no known reason why it could not be used for any concentration of sulfuric acid. It has been used in a temperature range of 212 to 482°F.

Foamsil has been used most extensively to protect lead-bonded steel equipment by placing it between the lead and the internal ceramic or carbon-brick lining. Because of the relatively low heat transmission through the foamed silica, thickness of the brick lining can be materially reduced, thus effecting a cost reduction.

The silica insulation has been used with some success as an internal lining without brick. It has also been used in limited applications with non-metallic linings, and also with no impervious lining between steel shell and foamed silica.

All acid-proof mortars are not compatible with foamed silica because some shrink during drying, thus causing the insulation to spall. Synar No. 68 and Foamsil No. 1120 are two mortars that have been used successfully with the silica insulation.

Because foamed silica has an extremely low thermal coefficient of expansion, extreme care must be taken in the design phase. Similar care must be taken during installation to obtain best results.

Foamed silica is a rigid non-flexible material. Successful use depends upon ability to fabricate it to desired shapes. Although, in general, it can be cut in a similar manner to Foamglas, due to its much greater abrasive characteristic, certain difficulties do arise.

Just as with Foamglas, it may be cut with a 1" wide x 0.035" thick, flexible back, three-pitch, raker-tooth band saw blade, running at approximately 1000 fpm. Unfortunately, life of the blade is short, being between 20 to 45 minutes. Use of carbide-tipped band saw blades may solve this problem.

Where the material can be cut by circular saws, Skil-Perma-Grit blades have been found satisfactory. Use of Perma-Grit strips, attached to rollers for grinding the inside and outside diameter of pipe covering, is presently being investigated and appears promising.

For cutting the inner and outer diameter of curved segments, 25-grit silicon carbide stones are used. Material is held by clamps which swing from a pivot so as to grind the foamed silica in the required curve.

Cementing the cut pieces together has been done with Keene's cement, or with some of the previously mentioned mortars. However, each cement or mortar must be carefully selected for the particular installation.

(Foamsil is product of Pittsburgh Corning Corp., One Gateway Center, Pittsburgh 22, Pennsylvania.)

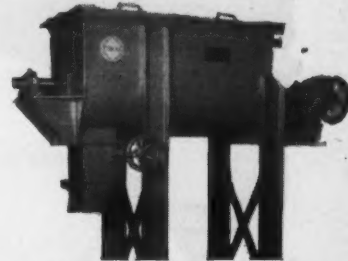
Check 1036 opposite last page.



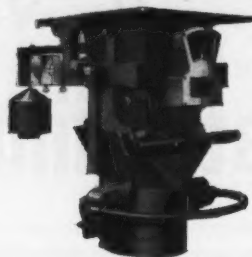
The Right Place to Look FOR A BETTER BUY



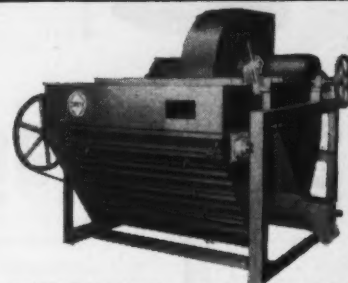
SIZING—New clean cut sizing at high speed without heat. Trial runs arranged in our plant.



MIXING—30 mixers, horizontal and vertical. Mixall and Sanimix in Stainless, and Standard.



WEIGHING—Portable bagging scales and accessories. 2 models—weigh 25 to 200 lbs. Also packers.



CLASSIFYING—Choice of designs and models in a variety of sizes for individual requirements.



CONVEYING—Bucket elevators, screw and belt conveyors to individual installation requirements.

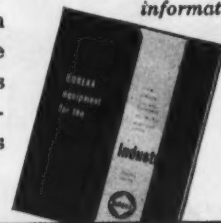


SCREENING—Vibratory closed-circuit rapid uniform screening. 7 sizes in single or double deck models.

EUREKA EQUIPMENT DOES SO MUCH— SO LONG—FOR SO LITTLE

Each unit expertly designed, precisely built to deliver efficient, durable service...alone or in combination with other EUREKA units. Wide selection of standard models in a variety of sizes and capacities or custom built to exact specifications. Your request for information or quotations will receive prompt, personal attention.

Write for technical information.



S. HOWES CO., INC.

MANUFACTURING ENGINEERS • SILVER CREEK, N. Y.

Check 1037 opposite last page.

For more information on product on pages 38 B-C specify 1034... see information request blank opposite last page.



moduflexTM line: over a hundred sizes and styles

NEW turbine agitator line

Chemineer, Inc., presents the Moduflex line — the first new approach to turbine agitator design in 15 years. If you judge agitator performance in dollars, check these outstanding advantages:

1. Moduflex inventoried components let you specify exactly the turbine agitator you need—and give you prompt delivery at standard, competitive prices. Because parts are modular, unanticipated changes are easily made to meet new requirements.
2. Moduflex turbine agitator drives give you the advantages of the most advanced concepts in reliable machine design. Gear teeth are ground after hardening for extremely quiet operation — splined shafts hold change gears—short bearing span and large diameter shafting prevents harmful dynamic deflection. You can use a Moduflex agitator in many applications formerly requiring steady bearings.
3. Moduflex turbine agitators perform the job for which they are recommended or you get your money back. To see why leaders in the CPI are buying Moduflex turbine agitators, request technical Bulletin M-200 now. Chemineer, Inc., 1044 East First Street, Dayton 2, Ohio. Telephone BALdwin 2-8361.

Moduflex turbine agitators use inventoried modular components to form 5 basic drive styles: right angle head, belt drive, in-line with coupled motor, in-line with integral motor, and variable speed. Drives are inventoried in 7 case sizes with 17 AGMA gear ratios in each size. Mounting options: open tank flange, closed tank flange with stuffing box or mechanical seal. Motors: 1 through 75 hp, any specs. Choice of impellers, wetted parts.



CHEMINEER, INC.

Check 1038 opposite last page.

NEW SOLUTIONS

Oil storage-tank leakage in sub-zero climate is halted

Problem: Seal-welding and mechanical-caulking methods of stopping oil-storage-tank leaks proved unsatisfactory at the refinery of the British American Oil Company, Ltd. in Moose Jaw, Canada. Severe climate of area intensifies tank-repair problem of stress from thermal expansion.

Seal welding proved too expensive. Also, it required emptying of tank and rendering it completely gas-free. Mechanical caulking was not always satisfactory.

Solution: Based on experimental results, it was decided last fall to repair two tanks with aluminum-filled epoxy resin. Dozens of small weeps in one riveted fuel-storage tank were repaired with compound. In another tank, large leak was handled.

Results: Examination this spring showed repair of multiple weeps in first tank to be approximately 90% successful in withstanding ravages of winter. Repair of large leak in second was complete success.

Varying performance has been attributed to differing cleanliness precautions which were taken, prior to repair of each tank. Where multiple leak areas were involved, it was more difficult to obtain high degree of cleanliness.

(Metalset A-4 is product of Smooth-On Manufacturing Company, 51 Harrison Ave., Jersey City, N.J.)

Check 1039 opposite last page.

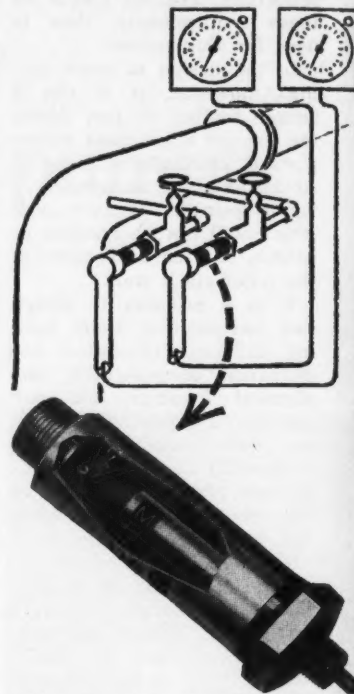
Grinding-mill output upped by 75 bpd by load control

Problem: Maintenance of optimum grinding rates in ball mills was considered essential by Louisville Cement Company for their plant at Speed, Indiana. In their closed-circuit dry-grinding process, oversized particles are separated by air and recirculated.

Mills are utilized for pulverization of both raw mate-

MEASURING PRESSURE?

For greater accuracy
use precision-calibrated
SR-4® Pressure Cells



If you are measuring or controlling fluid pressure, you should know these facts about accurate, rugged SR-4® Pressure Cells. Standard accuracy: $\pm 1/4\%$ (higher accuracies available for calibration). Calibration does not change with time. Contact fluid directly; require no external piping. Contain no moving parts. Output signal suitable for remote indication, recording or control. Widest pressure range coverage of any commercially-available transducers: 0 PSIA to 100,000 PSIG. Low line, low differential and high frequency models available. Special configurations can be provided.

Write for more information—address Dept. 16-J, and ask for Bulletin 4365

FIRST in force measurement



BALDWIN-LIMA-HAMILTON

Electronics & Instrumentation Division
Waltham, Mass.

SR-4® Strain Gages • Transducers • Testing Machines

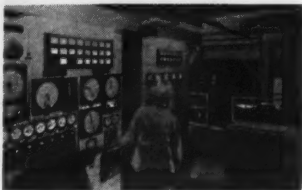
Check 1040 opposite last page.

CHEMICAL PROCESSING

rials (rock and shale) and clinker from kilns producing finished cement. Fineness of grind must be carefully controlled at both production stages to assure desired product properties.

Solution: Instrumentation, consisting of thermal converters as load-sensing devices and electronic recorder-controllers, were installed to provide control of mill feed rate in accordance with degree of mill loading.

This decision was reached after analysis showed that electric load on motors operating mill discharge elevators



Control system maintains optimum feed rate to grinding mills by relating them to load on discharge-elevator motors

bore direct relationship to mill loading (and therefore to grinding efficiency).

In system, thermal converter measures kw load on discharge-elevator motor. Through motor-operated drive unit, recorder-controller regulates speed of feed-conveyor motor.

Recorder-controller incorporates proportioning, rate, and reset actions to maintain close automatic control at desired grinding rate. Each ball mill has dual set of elevators with thermal converter on each. Measuring circuit is so arranged that either converter can be connected to recorder-controller, or both converter outputs can be averaged for mill-load control.

Results: System has been successful in maintaining optimum grinding rates. As result, mill output has been increased by 75 barrels/day.

(Speedomax H recorder-controller is product of Leeds & Northrup Company, Rockland & Stenton Avenues, Philadelphia, Pennsylvania.)

Check 1041 opposite last page.

EIMCO



design and production

PROGRESS REPORT

B-395

Process Engineers, Inc., division of The Eimco Corporation: 420 Peninsular Ave., San Mateo, Calif.

World's Largest Covered Thickeners in Operation At U. S. Borax & Chemical

Four 230 ft. dia. Eimco-Process heavy-duty thickeners have been in operation for over a year at the United States Borax and Chemical Corporation refinery in Boron, California. These totally enclosed and insulated thickeners, largest of their kind in the world, are part of the CCD circuit from which the strong Borax solution goes to crystallization.

The thickener designs, developed in close cooperation with Pacific Coast Borax Division personnel and the engineering constructors, are custom-adaptations of Eimco-Process Type CX mechanisms. The cover of each unit is supported from radial trusses receiving central support from an 8 ft. dia. concrete column with steel shell that also carries the entire weight and torque of the thickener mechanism. The drivehead with split main gear and bearing was designed to the specific requirement of providing easy maintenance access. A special liquid seal was devised to protect the drive unit from tank vapors, as well as to ensure close control of process conditions.

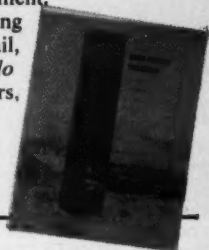


Four totally enclosed Eimco-Process thickeners at Boron, California

NEW BULLETIN AVAILABLE

We recently completed an eight page bulletin describing our thickeners, hydroseparators, air-lift agitators, reactor-thickeners, slurry mixers and related equipment. It also covers recent design innovations such as our unique Thixo arms and platform lifting devices, and should be in your reference library even if your immediate plans do not include thickening equipment.

A request will bring one by return mail, or, if your plans do involve thickeners, our nearest sales engineer will deliver a copy in person.



Other installation features were the resting of the steel thickener tanks on oiled sand for corrosion prevention; continuous torque recording; and handling the thickener underflows with steam driven reciprocating pumps.

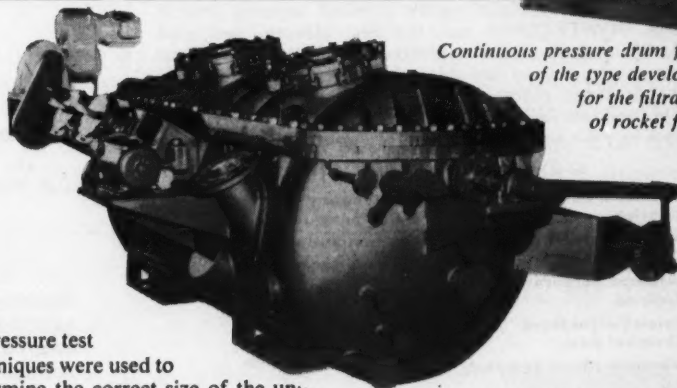
This \$20,000,000 processing plant, on an 80 acre desert site, was designed and constructed by Southwestern Engineering Company and Ford J. Twaits Company as a joint venture. It has substantially increased the U. S. Borax capacity and is playing an important part in the production of high energy boron fuels for the space age.

Eimco Filtration Equipment Plays Important Role in Producing Rocket Fuels

At another plant, producing high energy fuels, engineers were faced with a troublesome filtration problem. They had to filter a fuel having an extremely low slurry viscosity, a high percentage of hydrogen in the gas, and containing a dangerously flammable material.

This problem was referred to Eimco's Research and Development center at Palatine, Illinois. Here, the Company's filtration research engineers, after a series of tests, were able to work out special adaptations for a continuous pressure drum filter that met all the specialized application requirements.

Pressure test techniques were used to determine the correct size of the unit. Intricate seals were devised to keep air out of the pressure vessel. Changes were made in the hydraulic system. And, the filter was furnished with complete instrumentation.

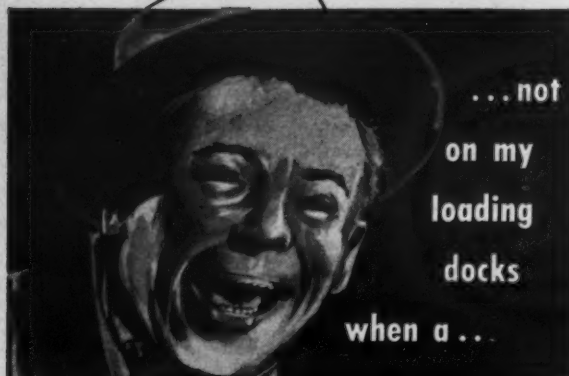


Continuous pressure drum filter of the type developed for the filtration of rocket fuels

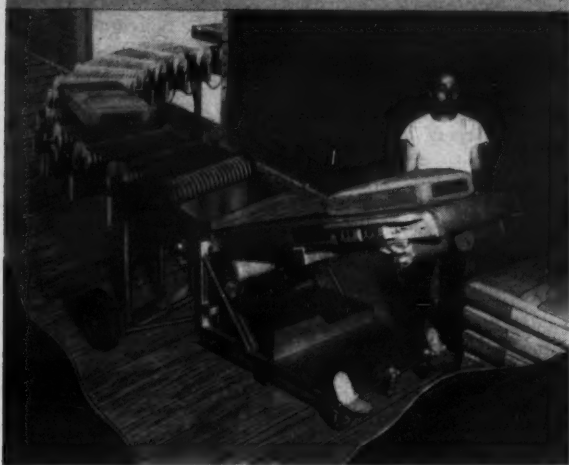
This is typical of how Eimco's unexcelled research facilities and valuable backlog of experience in engineering custom-designed filter equipment can solve difficult filtration problems.

Check 1042 opposite last page.

CAR LOAD BAGS BY HAND?



POWER-CURVE automatic installation
will show me a healthy saving in just one season!



POWER-CURVE makes a quick payout on chemicals, loading without physical lifting, without interruption and with just one man...replaces a steady parade of hand trucks and labor. POWER-CURVE will flatten filled bags, route them to storage or to the dock, fill box cars or trucks from end-to-end and to full height neatly stacked against transit damage. POWER-CURVE can transfer, elevate, sort and select. It can unload, convey mixed loads, palletize and economize! It is used by dozens of chemical companies in one or more plants. It is self-powered, mobile, fully flexible and variable in height...Write for information tailored to your requirements, no obligation.

12 TYPICAL POWER-CURVE USERS

Aluminum Company of America
Barrett Division Allied Chemical and Dye Corp.
Celanese Corporation of America
Columbia-Southern Chemical Corp.
Diamond Alkali Company

E. I. Dupont de Nemours & Company, Inc.
Eastman Kodak Company
Koppers Company, Inc.
Monsanto Chemical Co.
Pacific Coast Borax Co.
Morton Salt Company
Union Carbide Corp.

POWER-CURVE

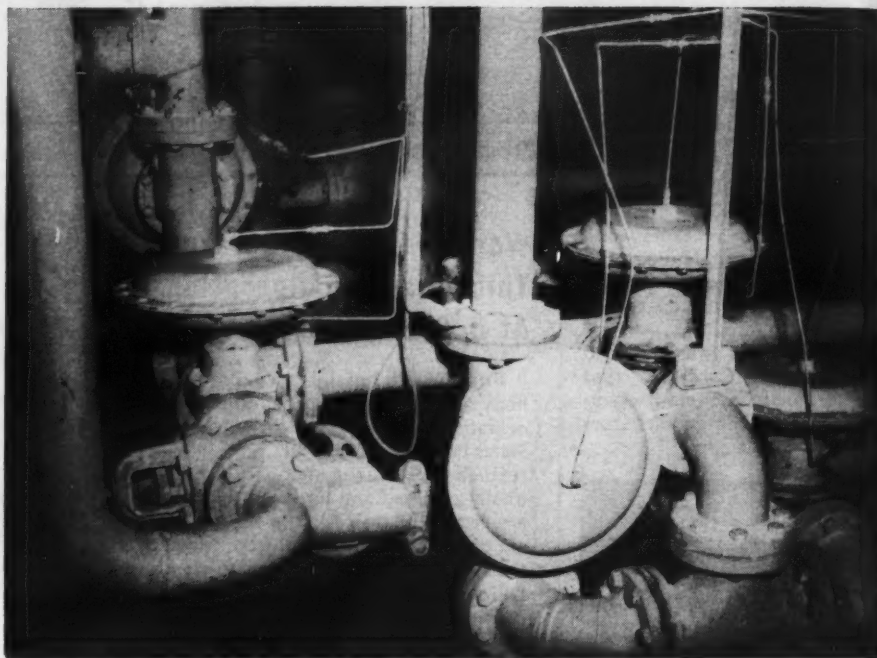
CONVEYOR COMPANY

2185 SOUTH JASON ST., DENVER 23, COLORADO

Check 1043 opposite last page.

NEW SOLUTIONS

of processing problems



Eight of valves in service at the Lucky Mac plant

Low pressure drop... reason for valve selection

**Low diaphragm operating pressure against
high solution pressure also factor in
choice of 90 slack-diaphragm-operated valves
for ion exchange system**

GORDON WEYERMULLER, Associate Editor
with **M. I. RITCHIE**, Mill Superintendent
Utah Development Company, Riverton, Wyoming

At the Lucky Mac uranium mill, 90 diaphragm-plug valves are being used to advantage in an ion exchange system controlling solution flow. About 60 rubber-lined valves of 4" size and 30 neoprene-lined valves of 3" size are in use.

This particular valve was selected because of the very low pressure drop across the valve. Another factor favoring choice was low diaphragm operating pressure against high solution pressure (25 psi on diaphragm, up to 100 psi solution head).

Valve is designed with metal plug molded to rubber or plastic diaphragm. This forms the one-piece combination of diaphragm and plug, called Dia-Plug.

Working parts of valve are isolated by diaphragm from flow material. These working parts and plug can be replaced on the line. Minimum force is required to open or close. Valve will close tight even if diaphragm is damaged.

Valve is packless and corrosion-resistant. It can be used with acids and alkalis at temperatures to 400°F and pressures to 250 psi. Sizes are available to 10" in a variety of different metals and linings.

At Utah Development, it was found necessary to use two-ply, nylon-reinforced diaphragms instead of the one-ply cotton type.

Indicator rod, showing whether valve is open or closed, protrudes through opening in valve bonnet. It has been found possible for acid fumes from surrounding area to penetrate this opening to mild steel interior. This has not been a serious problem at the plant. Company manufac-



Valve can be easily disassembled. Working parts and plug can be replaced on line



turing valve can provide a stainless indicator with an O-ring seal to prevent fumes from entering top works of valve. This is an optional extra feature. Valve is being used for completely open or completely shut service at Utah Development.

(Dia-Plug valve is product of Dia-Plug Valve Corp., 1622 Fillmore Ave., Buffalo 11, N. Y.)

Check 1044 opposite last page.

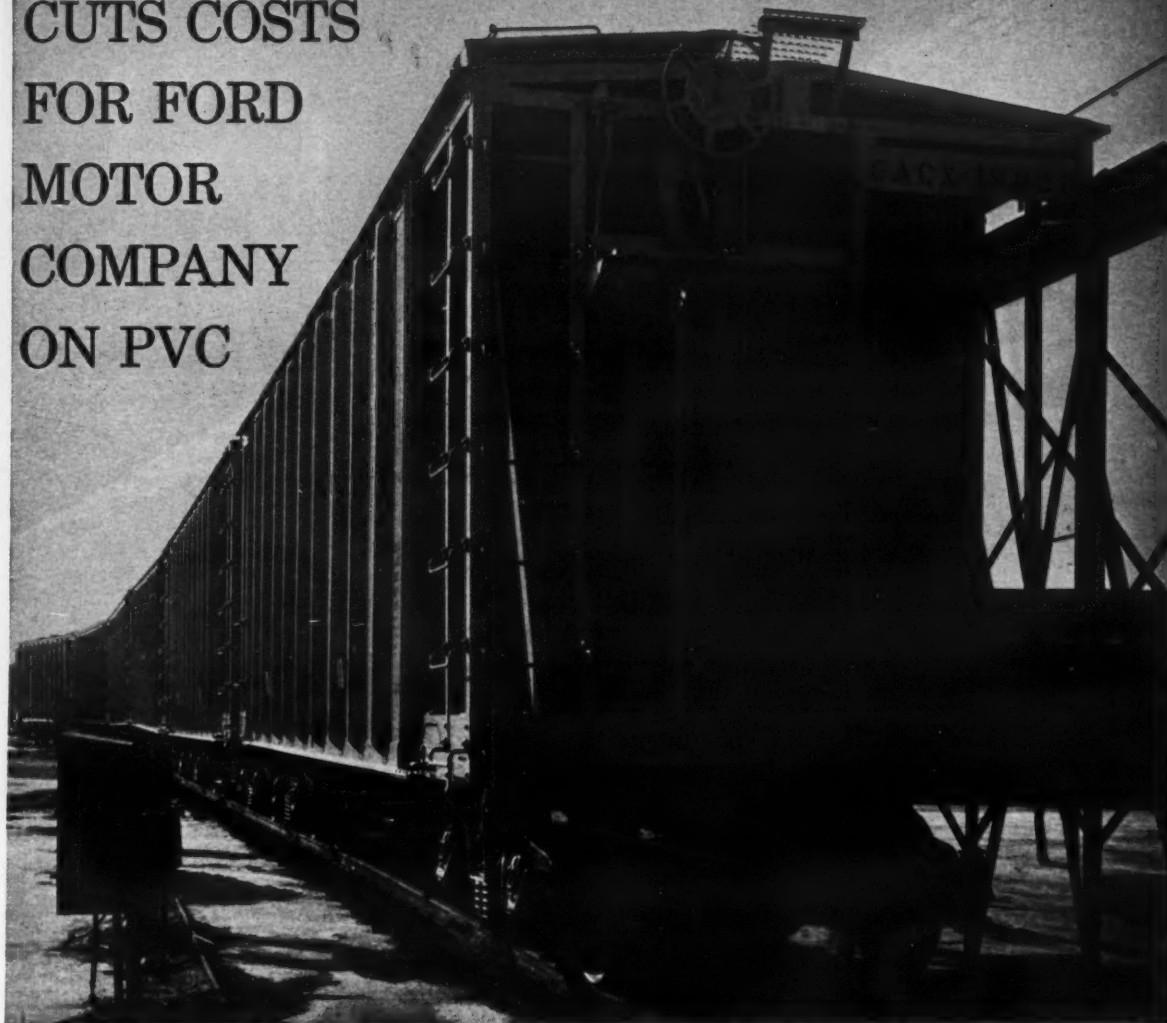
Dolomite kilning process proves fertile ground for gas analysis

Fusion reduction is aided by analyzer-recorder

Problem: Lack of running data concerning % combustibles and oxygen in kilning dolomite (calcium magnesium carbonate) precluded optimum control of manual operation at Kaiser Aluminum & Chemical's Natividad plant at Salinas, California.

Continued operation under reducing atmospheric condi-

BULK SHIPPING VIA AIRSLIDE® CARS CUTS COSTS FOR FORD MOTOR COMPANY ON PVC



Producing a better car for the least possible money is a constant challenge to auto manufacturers. To help solve this problem the Ford Motor Company is cutting costs of transporting PVC resin by bulk shipping in Airslide cars.

As a result, Ford not only gets substantial savings, but receives the PVC without in-transit contamination.

The Airslide car is filled by blowing the

resin through one of the top hatches of the car. At the unloading point, low pressure air is used to aerate the PVC and cause it to discharge by gravity. The product is then taken under vacuum through a pipe to storage bins.

If you ship or receive dry granular chemicals in bulk, investigate the advantages of shipping via Airslide car. You'll find it pays to plan with General American.

Airslide and Dry-Flo Car Division
GENERAL AMERICAN TRANSPORTATION CORPORATION
135 South LaSalle Street • Chicago 3, Illinois
In Canada: Canadian General Transit Co., Ltd., Montreal



Check 1045 opposite last page.

MILLIONS OF DOLLARS CAN BE SAVED

**Struthers
Wells**

STANDARD HEAT EXCHANGERS

Standard heat exchangers are suitable for a wide range of services, including heating, cooling, vaporizing and condensing, with the maximum usefulness in the smaller sizes.

Standardization of mechanical design and price offers many important advantages to the user.

Savings may be realized in the user's engineering time, due to ease in procurement, inspection of fabrication, checking drawings and construction details.

In plant layout work, the size of the unit can be quickly established, and the complete information available allows exact details to be fixed at once.

Immediate delivery on most units often results in impor-

tant savings, due to early completion of the project. Interchangeability allows reuse of the equipment in other services, and increases salvage value.

Important cost savings are available to the user, due to economies in manufacture.

Savings to the process industries, by heat exchanger standardization, are estimated at several million dollars annually.

Struthers Wells has just issued a new bulletin, giving complete mechanical design and prices, covering a number of standard sizes, to about 1200 square feet of surface, and in six principal types.

Thermal design data are included in the bulletin, to allow the user to fix the size of the required unit, in various services.

A large stock of standard exchangers allows immediate shipment, in most sizes. Equipment is available in carbon steel, also with non-ferrous tubes, and in stainless Types 304 and 316.

Complete Guide

to the selection of a standard SW Heat Exchanger is contained in Bulletin B-20. Write for your copy today

STRUTHERS WELLS CORPORATION
WARREN, PA.

Check 1046 opposite last page.

NEW SOLUTIONS

tions is detrimental to basic kiln lining and tends to increase kiln coating. Shut-downs, necessitating lengthy cooling-off periods and brick replacement, are costly.

Solution: An oxygen and combustibles analyzer and receiver-recorder were installed to provide kiln operator with information. Unit operates on catalytic-combustion principle to give continuous and independent measurements of flue gases.

All firing is performed manually. Gas flow is set in accordance with temperature. Information provided by in-



Gas analyzer-recorder aids operator in determining optimum parameters for dolomite-kilning process

strument is utilized in helping maintain optimum parameters of air flow, in-feed rate, draft, and kiln speed. In application, a gas sampler was placed in flue stack of kiln producing dead-burned dolomite.

In analyzer, flue-gas-stream sample is passed over heated platinum electrodes. Electrodes act as catalysts for burning oxygen and combustibles in sample. Resistance of each is compared with compensating resistance through Wheatstone bridge. Resulting signals are recorded as % oxygen and combustibles.

Wire resistance changes in proportion to amount of heat developed in burning sample. Excess oxygen is burned with hydrogen, and excess combustibles with oxygen.

Results: Information provided by instrument aids operator in determining optimum parameters of kilning process. Kiln operators readily accepted analyzer as a helpful tool in maintaining controlled operating conditions. Plant management feels instrument has been beneficial in reducing kiln coating, thus elimi-

STRUTHERS WELLS PRODUCTS PROCESSING EQUIPMENT DIVISION

Crystallizers . . . Direct Fired Heaters . . . Evaporators . . .
Heat Exchangers . . . Mixing and Blending Units . . . Quick
Opening Doors . . . Special Carbon and Alloy Processing
Vessels . . . Synthesis Converters

BOILER DIVISION

BOILERS for Power and Heat
. . . High and Low Pressure
. . . Water Tube . . . Fire
Tube . . . Package Units

FORGE DIVISION

Crankshafts . . . Pressure
Vessels . . . Hydraulic Cylinders
. . . Shafting . . . Straightening and Back-up Rolls

NEW SOLUTIONS

nating some costly kiln shooting or downtime to remove this material manually.

(Oxygen and combustibles analyzer and receiver-recorder are products of Bailey Meter Company, 1050 Ivanhoe Rd., Cleveland 10, Ohio.)

Check 1047 opposite last page.

Incinerated paper wipers yield up to \$1000/month in precious-metal alloys

Paper wipers, utilized on precious metals, are being incinerated after use in order to recover up to \$1000/month, in alloys of gold, platinum, iridium, and similar metals, for Wilkinson Company of Santa Monica, California.

Discarded paper wipers are burned in incinerator. Ashes are then lowered into furnace where metal becomes liquefied. It is recovered in solid form after cooling. Alloys, collected as metal "buttons", are worth from \$20 to \$100/oz.

(Further information concerning Scott paper wipers may be obtained from Industrial Packaged Products Division, Scott Paper Company, Front & Market Streets, Chester, Pa.)

Check 1048 opposite last page.

Shingle-coating emulsion in phenolic-lined drums is well protected

Phenolic-lined 55-gal steel drums are being used to package an alkaline emulsion used to weather-proof asphalt shingles, which are produced by Franklin Research Company of Philadelphia, Pennsylvania.

Although emulsion is not highly reactive with steel, it could cause rusting of drums during storage. Value of product (\$700 to \$800 per drum) is considered justification for careful efforts to prevent container leakage and emulsion contamination.

To permit additional product mixing at user's plant, full open-head drums with lever-type seal-closure rings are

utilized. Since power mixers are used in drums, durable linings are mandatory.

Phosphatizing process first prepares steel surface for



Phenolic-lined steel drums provide container-corrosion and product-contamination protection for a shingle emulsion

phenolic-application. Two lining coats are then sprayed automatically and oven-cured at precisely controlled time-temperature schedules.

(Phenolic-lined steel drums are product of Container Division, Jones & Laughlin Steel Corporation, 3 Gateway Center, Pittsburgh 30, Pa.)

Check 1049 opposite last page.

Jacketed Dacron hose is type selected for fire duty

A successful four-year experience with Dacron-jacketed fire hose, at American Cyanamid Company's Fortier plant in Avondale, Louisiana, was reason for recent decision to replace all conventional hose with single-jacketed hose of Dacron. Hose is impregnated with, and over a core of, neoprene.

Dacron hose has proved to be unaffected by acid spills, chemical fumes, and mildew. In long run, new hose is expected to be less expensive than double-jacketed conventional hose, due to expected longer life span.

(Quaker-thermoid Dacron fire hose is product of Thermoid Division, H. K. Porter Company, Inc., Alcoa Bldg., Pittsburgh 19, Pa.)

Check 1050 opposite last page.



NEW! Catalin RESIN 301

substantially increases

WET STRENGTH *in paper...without increasing cost*

Because it is more efficient, Catalin Resin 301 . . . a modified, cationic urea-formaldehyde resin . . . can substantially upgrade wet strength with the same percentage of resin solids previously used . . . or cut resin costs by maintaining present wet strength properties with less resin solids. You gain in other ways too . . . Catalin Resin 301 is lighter in color . . . and reacts exceptionally well in the presence of dyes. Dry tensile, mullen and folding endurance is also improved.

Usable in a wide variety of bleached and unbleached pulps, Catalin Resin 301 develops about 50% of its final wet strength as it leaves the machine . . . full cure is reached within 2-3 weeks. Since wet strength is developed slowly, broke can be easily reclaimed.

Samples, specification sheets, laboratory data and technical assistance are yours for the asking. Catalin welcomes your inquiry.

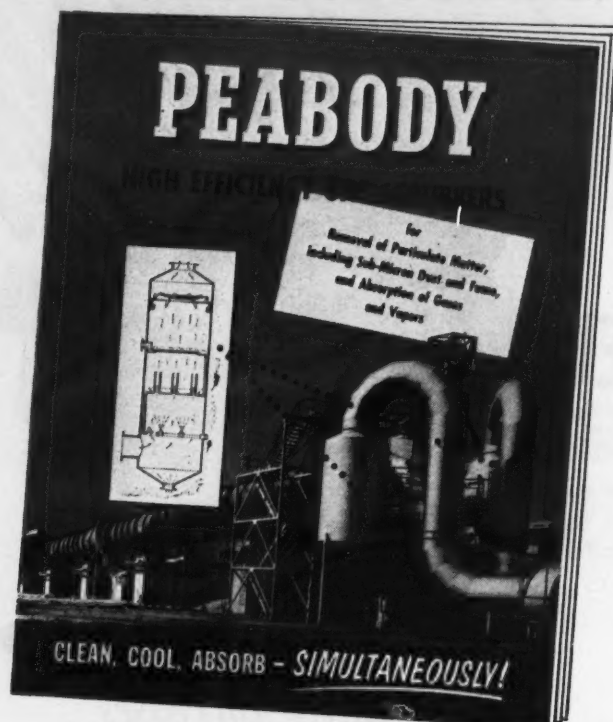
Catalin Corporation of America
One Park Avenue, New York 16, N. Y.

Catalin

PLANTS:
Ford, New Jersey • Columbus City, Illinois
Thomasville, North Carolina

Check 1051 opposite last page.

Now! NEW PEABODY GAS SCRUBBERS



To Purify Gas • Recover Product • Control Atmospheric Pollution

Shop-assembled units for gas capacities of
100 to 250,000 c.f.m.

New Bulletin 203-C describes:

*Package Scrubbers
High-Velocity Scrubbers
Selective Agglomerating and Cleaning Stages
Process Applications*

Mail coupon today for your copy of this bulletin!

Peabody Engineering Corporation
232 Madison Avenue, New York 16, N. Y.

Please send me a copy of Bulletin 203-C.

Name: _____ Title: _____
Company: _____
Address: _____
City: _____ Zone: _____ State: _____

9-324

PEABODY ENGINEERING CORPORATION

232 MADISON AVENUE, NEW YORK 16, N. Y.

OFFICES IN
PRINCIPAL CITIES

SUBSIDIARIES
In England: PEABODY LIMITED In Canada: PEABODY
ENGINEERING CORPORATION OF CANADA LTD.

Check 1052 opposite last page.

NEW SOLUTIONS

Top purity water assured in nuclear fuel plant by demineralizers

Automatic system yields
3000 gph of 500,000-ohm
water

Problem: Expansion of nuclear fuel element manufacturing facilities at M & C Nuclear, Inc., Attleboro, Massachusetts, required the addition of a system for producing large quantities of high-purity water.

Water is a raw material of critical importance in the plant's operations. Whether used for rinsing or processing, if it contains even the most



Automatic demineralizing system produces 3000 gph of 500,000-ohm water for nuclear fuel element manufacturing facility

minute amounts of chlorine or other impurities, stains will occur and undesirable side reactions may take place.

Rinse water must be of a purity at least equal to quadruple-distilled water. This permits a molecularly-clean surface to be obtained and also assures high heat transfer characteristics in the water.

Solution: An efficient water demineralization system capable of producing 3000 gph of 500,000-ohm water was installed. Designed for continuous, automatic operation, demineralization is achieved by mixed-bed ion exchange principles.

Raw water is fed through two filters, the second of which uses activated carbon. Filtered water is then sent to one of two mono-column demineralizers. One unit is always in operation while other one is on standby.

Automatic recorder charts conductivity of effluent going

into process line at all times. In addition, visual purity meters register conductivity of effluent of each unit.

When column supplying process water reaches preset purity point, standby unit automatically goes through a rinse cycle. When effluent reaches preset purity level, standby unit automatically cuts itself into process line. Exhausted column then cuts itself out, goes into regeneration cycle, and reverts to standby.

Results: In continuous operation for over a year, the water demineralization system has met all expectations. Units operate fully automatic. The only attention ever given to system is periodic checkup on caustic and acid supplies, which units draw upon during their regeneration cycles.

(Penfield automatic demineralizing systems are products of Penfield Manufacturing Co., Inc., 19 High School Ave., Meriden, Conn.)

Check 1053 opposite last page.

Methods of disposal of hydrochloric acid generated at Army Chemical Corps chlorine plants which may save nearly \$2 million in operating costs are described in 172-page report. PB 151640, Disposal Problems of Chlorine Plants, may be obtained for \$3.00 from OTS, U. S. Department of Commerce, Washington 25, D. C.

WANTED: NOMOGRAPHS — WORTH \$20 EACH!

Do you have a pet nomograph that could save time for other **CHEMICAL PROCESSING** readers? If so, send it neatly and accurately drawn, with a double spaced, type-written description to:

Data Editor

CHEMICAL PROCESSING
111 E. Delaware Place
Chicago 11, Illinois

We will pay \$20 for each one accepted and published.

CHEMICAL PROCESSING

PROCESS PIPING POINTERS

Free-use motion pictures can help cut piping costs

Better understanding by plant personnel of valve design, proper application and good piping practice can lead to substantial reductions in piping costs. Two 16 mm. sound films that graphically illustrate valve and fitting fundamentals are available for free showing to your personnel: "Piping Pointers"—a refresher for veterans... a basic for trainees, on valves and fittings, their installation and maintenance; "Choosing the Right Valve"—demonstration of valve types, their variations and uses. Entertainingly presented, these films cover their subjects accurately, clearly and comprehensively. For information, see below.



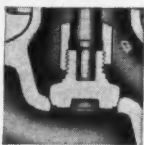
Extended bonnet valves for extremely low temperatures

These special bronze body globe valves are successfully controlling liquid oxygen and liquid nitrogen down to minus 318 F. Design features extended bonnet with insulation collar, replaceable seat and plug disc—all of stainless steel. Bonnet can be installed up to collar. Stuffing box is above cold zone; assures easy, dependable operation. Made for 150- and 300-pound pressure ranges, with flanged, screwed or solder ends. See below for more information.



Best choice in throttling design for corrosive service

Improved plug-type disc seating in these stainless steel globe valves gives sensitive flow control... resists corrosion, galling and scoring. All parts in contact with the flow are 18-8 SMO. Minimum clearance between disc and stem eliminates vibration and chatter, yet permits free swivel action. Extra long disc-stem engagement provides accurate disc guide for positive seating. For complete details, see Crane ad on next page.



For literature or data on products listed above, please contact
J. E. Bradbury, Manager,
Chemical Sales Dept. No obligation.

CRANE CO.

Gen'l Offices: 836 S. Michigan Ave., Chicago 5
VALVES • FITTINGS • PIPE
PLUMBING • HEATING • AIR CONDITIONING
Branches and Wholesalers Everywhere



processing and engineering data

268

Flow of Water from a Vertical Open-end Pipe

CLIFFORD L. DUCKWORTH
East Alton, Illinois

This alignment chart makes it possible to determine the quantity of water flowing from a vertical open-end pipe. It is based on the two equation¹:

$$V = 5.84 D_1^{2.025} H_1^{0.83}$$

$$V = 8.8 D_2^{1.29} H_2^{1.24}$$

Where V is volume in cu ft/sec, D is pipe diameter in

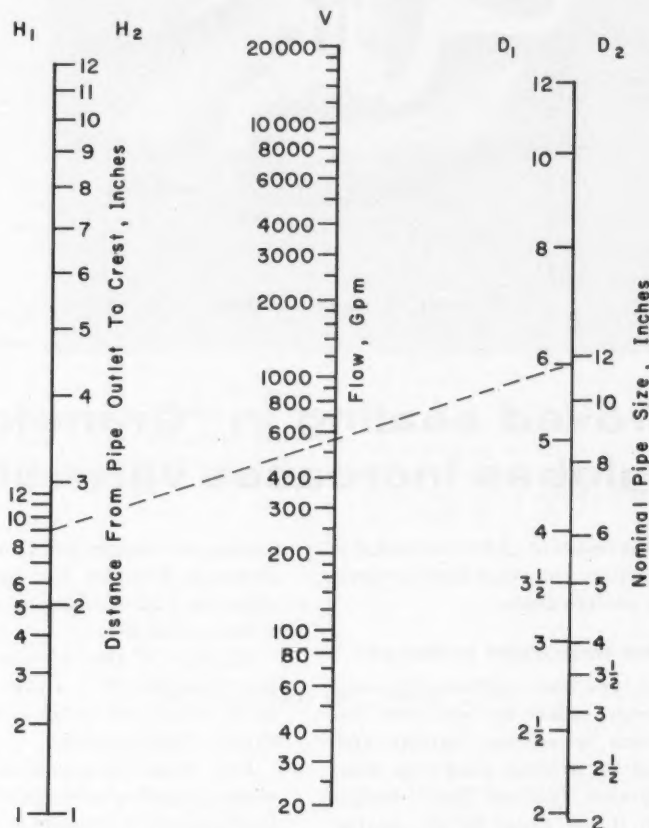
feet, and H is head in feet. The first equation (D_1 and H_1) is for jet flow. Second (D_2 and H_2) is for weir flow. For greater practicality, units of measure have been changed to gpm, nominal pipe size, and inches, respectively.

Water is flowing from a six-inch pipe. Distance from pipe

opening to crest is nine inches. The line, connecting the D_1 and H_1 scales (for jet flow), crosses V at 560 gpm.

LITERATURE CITED:

1) Brook, Maxey, "Chemical Engineering", Vol. 64, No. 2, 290 (1957).



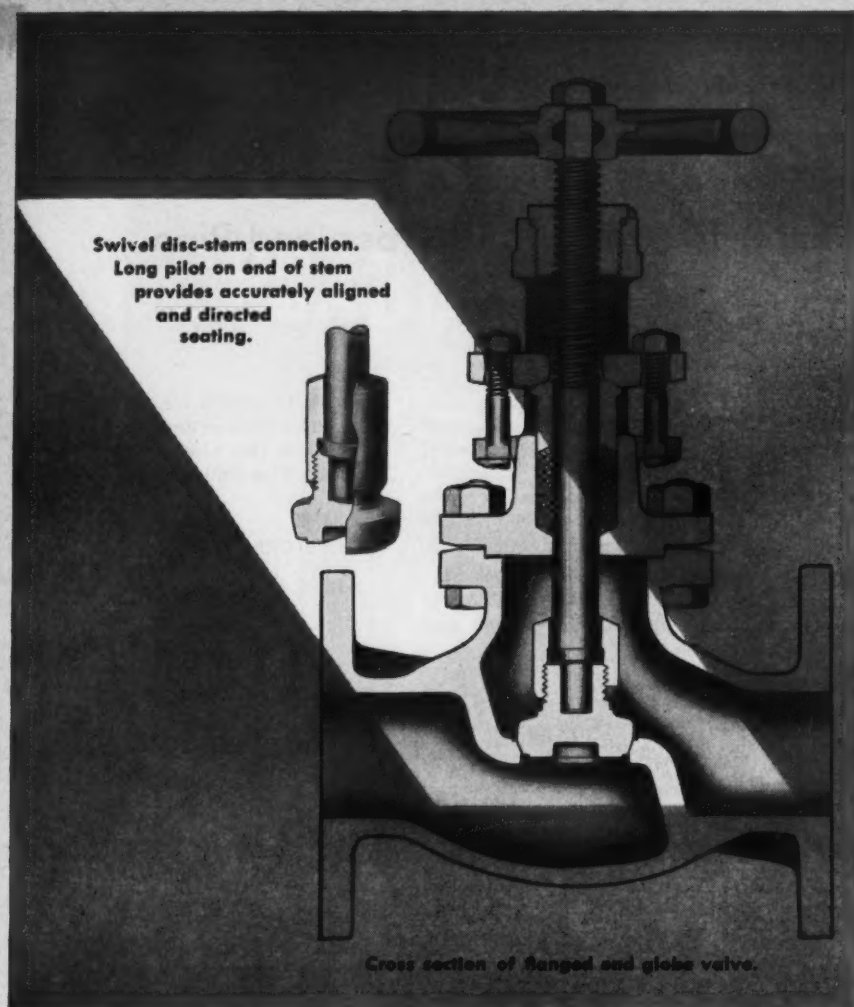
Pipe Dia, In	Transition for Weir to Jet Flow	
	Head-Inches at Transition From:	To:
2	0.48	2.4
4	1.80	4.8
6	1.80	6.0
8	3.60	9.0
12	4.80	12.0

© Putman Publishing Company 1959

Check 1054 opposite last page.

OCTOBER 1959

Chemical Processing — October 1959



Improved seating in "Craneloy 20" globes increases valve life

Here's a corrosion-resistant globe valve that's designed for throttling and other hard services in the control of process fluids.

Look at these important features:

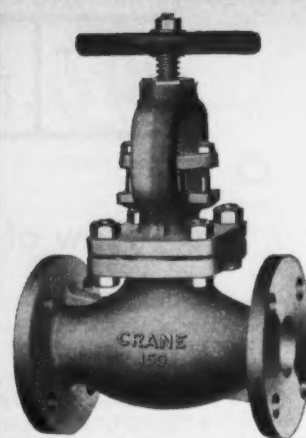
A modified plug-type disc combines the easy seating of a narrow, ball-to-flat seat with the superior resistance to erosion, cutting and scoring provided by a wide, plug-type disc.

Crane's exclusive "guided disc" design brings the stem thrust closer to the seating

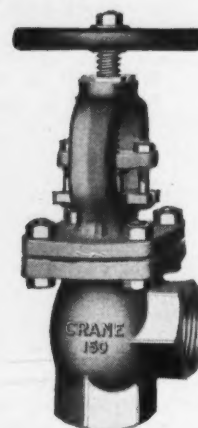
surface and assures positive closure. Minimum clearance between disc and stem eliminates vibration and chatter, yet permits free swivel action of the disc.

All parts of the valve in contact with flow are "Craneloy 20," a high nickel, high chromium alloy cast under closest supervision in Crane's own foundry.

For complete specifications and recommended applications, consult your local Crane Representative or write to address below.



No. 20011 globe. 1/2"-6", flanged ends; 1/2"-2", screwed ends.



No. 20012 angle. 1/2"-2", screwed ends; 1/2"-6", flanged ends.

NEW SOLUTIONS

Up catalyst production, cut processing costs with metal-mesh belt

Unit permits calciner to handle various sizes at one time

Problem: A faster, more uniform method of processing catalyst through a calciner was sought by a large manufacturer of catalysts. Individual orders were being handled on batch basis, involving considerable time and expense. Product varied widely in size and shape, ranging from 1/8" to 5" diam in spheres, squares, and oblongs.

Solution: When a new calciner was planned, company decided to include a continuously moving metal-mesh belt in the design. Belt has mesh openings of 3/32" and measures 95' long by 4' wide. Unit is small enough to retain small-sized catalyst, yet has enough open mesh to permit heated atmospheres to circulate freely through belt and around product.

Belt has friction drive. Retaining edges are welded and riveted to keep catalyst from falling off during movement. Return side of belt runs outside of heat zone.

To keep different batches of product separated during processing, an effective system of feed and discharge was developed. A drum elevator carries catalyst up to balcony where calciner is located. Unit dumps product into hopper fitted with vibratory-type feeder.

Vibrators assure even feeding of catalyst onto belt, while a leveling arrangement located just above belt controls bed depth on belt. After one batch is fed onto belt, belt continues on through calciner for short period before next batch is started. Consequently, batches remain separate as they pass through calciner. At discharge end, catalyst drops into hopper which refills same drum from which product was originally taken.

Results: The continuously moving metal-mesh belt has boosted production and has cut catalyst processing time

To page 50

CRANE® VALVES & FITTINGS

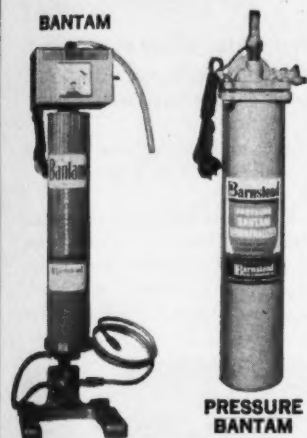
PIPE • PLUMBING • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Illinois—Branches and Wholesalers Serving All Areas

Check 1055 opposite last page.

BARNSTEAD
BANTAM
DEMINERALIZER

**DOES 5 WATER
PURIFICATION JOBS
EMPLOYS 5
INTERCHANGEABLE
CARTRIDGES**



STANDARD CARTRIDGE Produces ion free water at minimum cost . . . removes 1500 grains as NaCl (1300 as CaCO_3).

MIXED RESIN CARTRIDGE For operations demanding better than 1,000,000 ohms resistance and neutral pH. Cartridge capacity is 1230 grains as NaCl (1050 as CaCO_3). Approximately $\frac{3}{4}$ of cartridge capacity is million ohm water or better.

ORGANIC REMOVAL CARTRIDGE Removes organics, organic liquids and gases that would pass through a demineralizer. Effective in removing chlorine. Ideal for pre-treating demineralizer feedwater, for self-purifying high purity rinse systems and other processes where organics or odors in the water are objectionable.

OXYGEN REMOVAL CARTRIDGE Developed for cooling water loops where it is important to maintain low oxygen content to prevent corrosion. Cartridge removes one part per million of dissolved oxygen from 2500 gallons of water, or 6.8 liters (9.7 grains) of oxygen at standard temperature and pressure.

CATION CARTRIDGE Provides (1) precious metals recovery, (2) radio-active isotope recovery, at low cost, (3) also useful for removing volatile amines where heating plant steam condensate is being used as the feedwater for a Still, and (4) where close control over the pH of water is necessary, the cation cartridge in its ammonia or lithium form is effective.

Write for Literature
Barnstead
STILL AND STERILIZER CO.
66 LANESVILLE TERRACE BOSTON 31, MASS.



processing and engineering data

269

Conversion of Concentration Units for Petroleum Additives

O. M. DUNCAN

Indiana Farm Bureau Refinery
Mt. Vernon, Indiana

A number of additives are used in petroleum products. These are used to prevent corrosion and carburetor de-icing. They are also utilized as detergents, scavenging agents, gum inhibitors, and valve lubricants. In the heavier fuels, they are used as sludge conditioners, and emulsion breakers.

Several systems are in use to report concentration of additives. Among these are lb/1000 gal of oil, lb/1000 bbl (for 42-gal barrels), and lb/million lb.

For water solutions, parts per million are commonly used. For dilute solutions, density is practically unity, making it easy to convert from volume to weight basis. Variable density of petroleum products makes it more difficult to convert from one system to another.

This nomograph can be used to convert from lb/1000 bbl to ppm, for petroleum products ranging from 2 to 82° API gravity.

Two ranges are given:

A) 0 to 250 lb/1000 bbl

B) 0 to 25 lb/1000 bbl

with corresponding ranges of:

A') 0 to 1000 ppm

B') 0 to 100 ppm

Using The Nomograph

To calculate concentration of an additive in ppm, when number of pounds of additive used per 1000 bbl of oil is known:

Connect API gravity of oil found on right-hand scales with number of lb/1000 bbl on one of left-hand scales. Where line crosses oblique scale, read number of ppm on appropriate side, depending on which range is being used (A to A' and B to B'). Similarly, the ppm and gravity scales can be used to determine the number of lb/1000 bbl.

nomograph on page 50

© Putman Publishing Company 1959

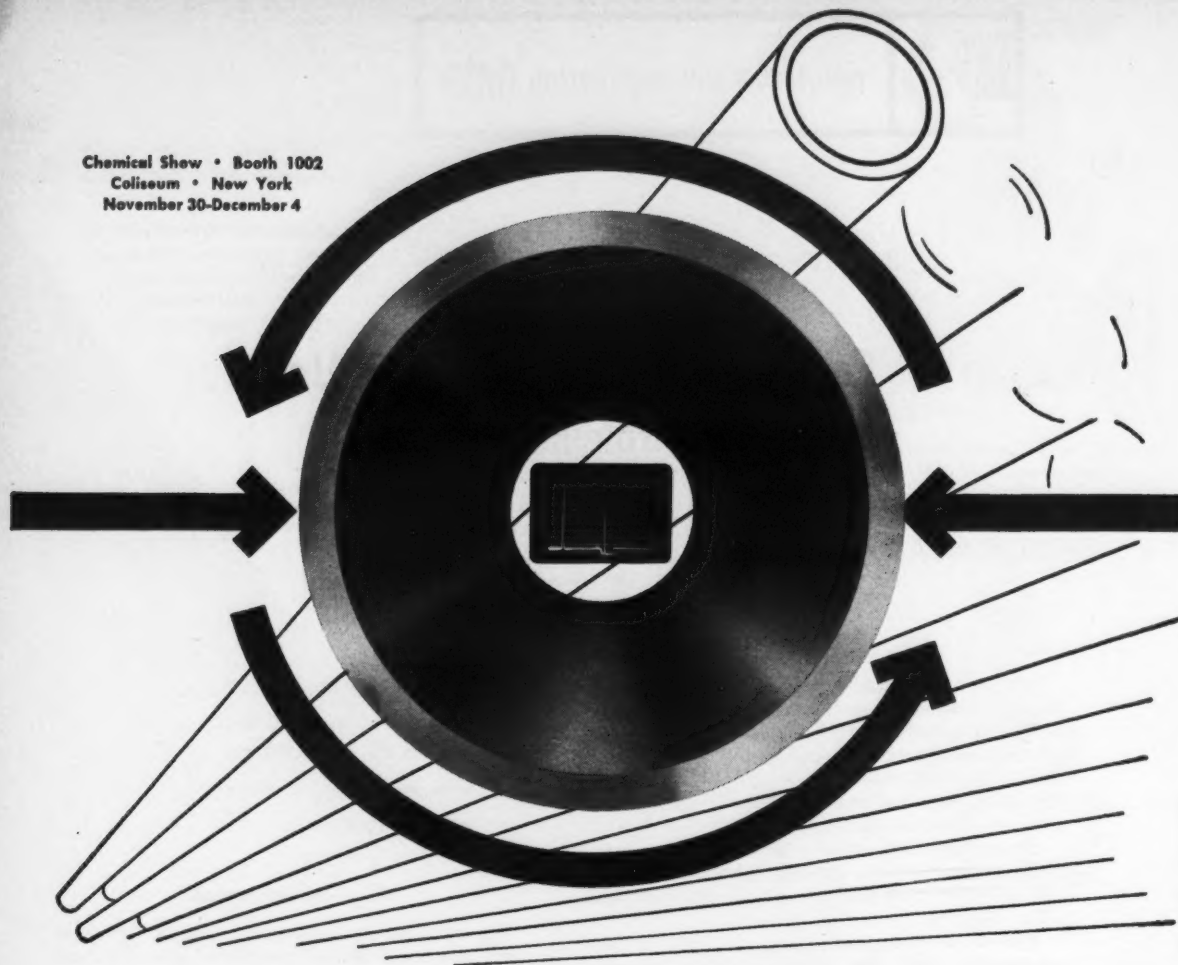
Chemical Processing — October 1959

Check 1056 opposite last page.

OCTOBER 1959

49

Chemical Show • Booth 1002
Coliseum • New York
November 30-December 4



B&W LECTROSONIC

A New Name for Carbon Steel Heat Exchanger Tubing

Dependability Proved by Five Years' Extensive Field Service
You get substantial savings with this sounder, more uniform tubing

B&W LECTROSONIC—a new name for heat exchanger tubing—is manufactured under the most exacting methods of quality control in the industry, to give you new standards of dimensional exactness and uniformity, ease of installation, and dependability—plus dollar-saving economy!

You can save on installation time. Every tube fits right and rolls in easily because it's uniform in size and tolerances. It bends easily *with the weld in any position*.

The weld is checked five ways—including 100% ultrasonic inspection—to give assurance of dependability.

This superior quality tubing was developed to meet the needs of the petrochemical industry for a dependable electric resistance welded carbon steel tube that is easily workable, strong, and less costly than seamless tubing formerly required.

B&W LECTROSONIC Tubing is available now either direct or through distributors.

Write today for B&W Bulletin TB-431 for full information—or call your nearest B&W District Sales Office. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.



B&W

THE BABCOCK & WILCOX COMPANY

TUBULAR PRODUCTS DIVISION

TA-9033-WP4

Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals

Check 1057 opposite last page.

NEW SOLUTIONS

From page 48

considerably. Unit permits many different sizes to be handled fast and efficiently. Heated atmosphere flowing through belt and around catalyst has resulted in a more uniformly processed product.

(Metal-mesh belt was manufactured by The Cambridge Wire Cloth Co., Cambridge, Maryland.)

Check 1058 opposite last page.

Sea water plant costs cut, start-up date speeded, with blown insulation

Material is quickly applied while plant is operating

Problem: In order to hasten start-up date for Aruba island's \$11 million sea water distillation plant, engineers decided to start production of



Using cement gun nozzle and 100 psi compressed air, granular vermiculite insulation is quickly applied to hot surfaces

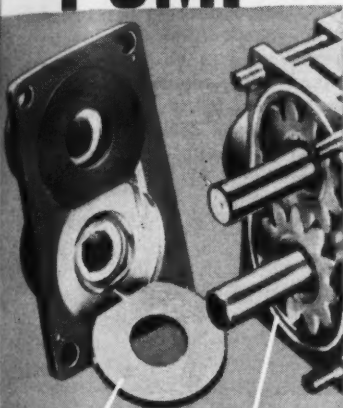
fresh water before applying insulation to major pieces of equipment.

Fastening conventional block insulation to the plant's 35 11'-diam by 30'-long evaporators, the deaerators, and main steam piping, would have taken several months. A fast and reliable method of applying insulation to hot surfaces (215°F) was required.

Solution: A method of blowing granulated insulation onto the equipment was developed. A total of 80,000 lbs of expanded vermiculite insulation was forced through a standard "Gunite" cement gun nozzle by 100 psi compressed

To page 52

METERING PUMP



- Floating Wear-plates compensate for gear wear, thermal reaction
- Hydraulically Sealed O-Rings in ground-lapped Housing Faces



- Grease-sealed Lantern Rings

Chemicals can't leak out . . . air can't leak in . . . No internal slip throughout its life.

Specify GEARCHEM® for constant flow metering accuracy within $\pm 1\%$.

Write for Catalog

ECO ENGINEERING COMPANY

12 New York Ave., Newark, N. J.

ECO

the big name in small pumps
for the process industries

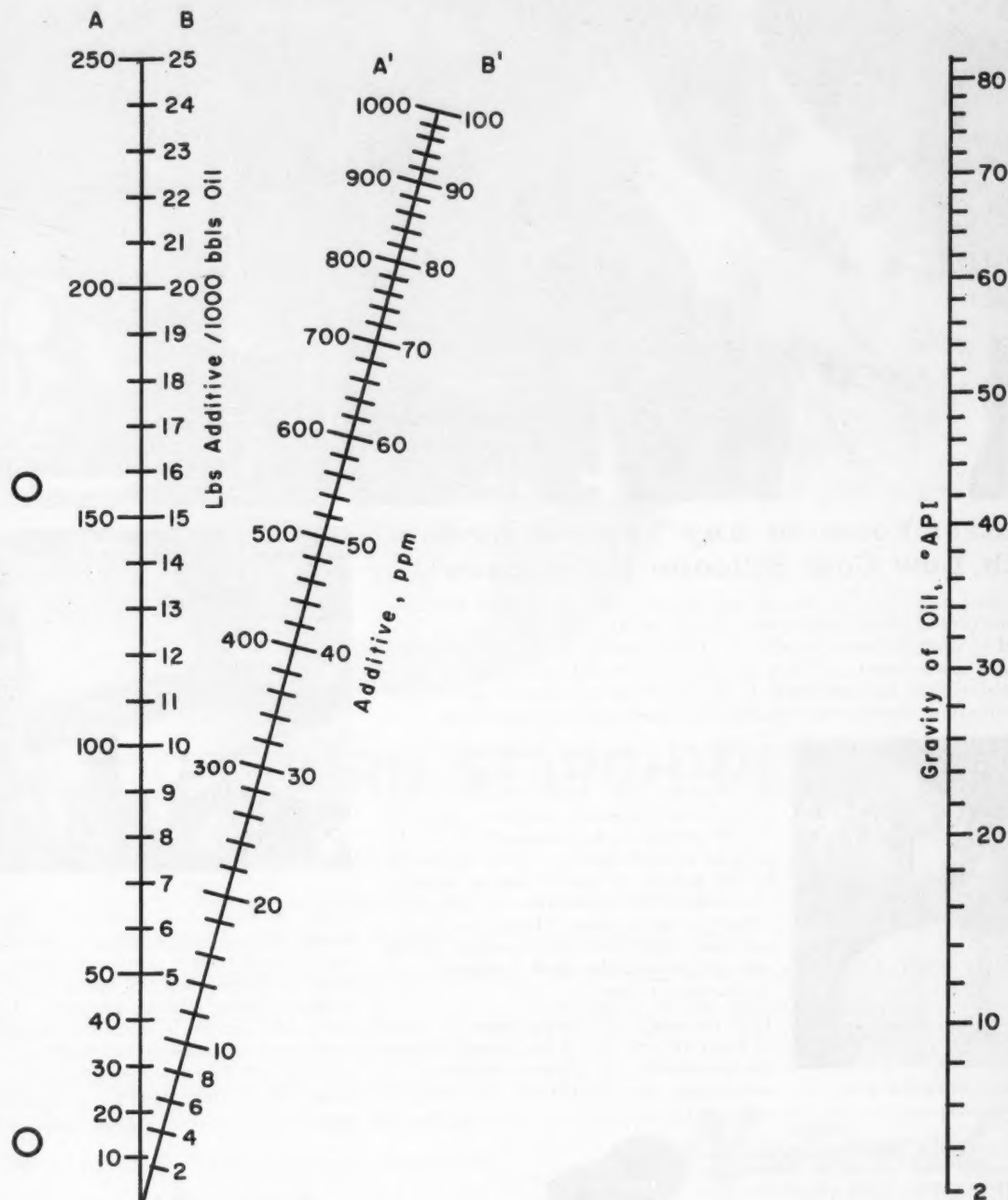


processing and engineering data

269

Conversion of Concentration Units for Petroleum Additives

From page 49



© Putman Publishing Company 1959

Check 1059 opposite last page.

OCTOBER 1959

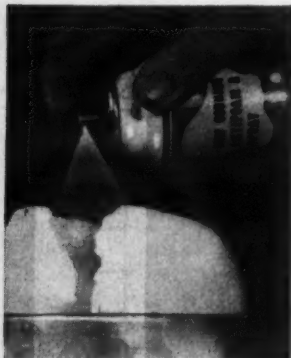
Chemical Processing — October 1959

Knock-Out Drops For Foam!



Control Foam in Any Type of System with Low Cost Silicone Defoamers

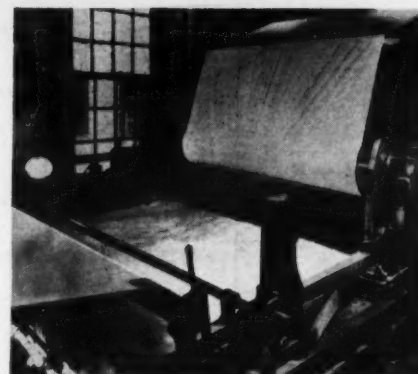
Does foam occur in your process operations? Chances are you can keep it under control at all times with a Dow Corning silicone defoamer. Job-proved in virtually every industry . . . petrochemical, textile, paper, paint, food and many others . . . Dow Corning silicone defoamers knock down the most violent and persistent foam. Eliminate processing slow-downs and boil-overs. Reduce fire hazards. Cut waste and clean-up costs.



AVAILABLE IN HANDY SPRAY CAN

And Dow Corning silicone defoamers are amazingly effective in minute quantities. For example, just 1 ounce of a Dow Corning silicone defoamer prevents foam in 31,250 pounds of dog shampoo, in 59,110 pounds of wire drawing solution, and in 62,500 pounds of paper coating solution . . . are similarly effective in defoaming adhesives, latices, caustic liquor, soap, varnish, emulsion paints and coatings, cutting oils, petrochemicals, food products . . . many, many others.

Dow Corning's continuing research study of foam and its control has brought about the availability of silicone defoamers as compounds and emulsions for different



IN PAPER SIZING

types of production systems — and in handy spray cans for split-second defoaming of smaller batch processes. Settle your foam problems once and for all time with a Dow Corning silicone defoamer. A generous trial sample is yours for the asking. Indicate your problem and system — oil, aqueous, nonaqueous, food product, or any other. Write Dept. 3222 for a rapid reply.

Your nearest Dow Corning office is the number one source for information and technical service on silicones.



Dow Corning CORPORATION
MIDLAND, MICHIGAN

ATLANTA BOSTON CHICAGO CLEVELAND DALLAS LOS ANGELES NEW YORK WASHINGTON, D. C.

Check 1060 opposite last page.

NEW SOLUTIONS

From page 50

air. Water is introduced at nozzle tip and the resulting mix hits the hot metal surfaces with high velocity.

There is no rebound or steaming. Adhesion is so good that vermiculite can only be removed with chipping hammers. After placement of the insulation to an average thickness of 2", surfaces are trowled smooth and weather coated with heavy pre-mixed black asphalt.

Results: Use of the expanded vermiculite insulation and the spraying process not only hastened start-up of the plant by several months, but also resulted in an estimated savings of 50% in costs. The granular material is less expensive than conventional block-type insulation, and untrained workmen were quickly taught to apply it. The latter point was especially important in Aruba, since there, as in many other foreign lands, skilled insulation men are scarce.

(Further information about expanded vermiculite insulation may be obtained from Johns-Manville Corp., 22 East 40th St., New York 16, New York.)

Check 1061 opposite last page.

(Sea water distillation plant was designed and built by Singmaster & Breyer, 420 Lexington Ave., New York 17, New York.)

Quick process switching without contamination in oil production

Problem: Positive action and tight seal were considered essential characteristics for processing-control valves at a recently completed oil-additive plant of Bardahl Lubricants Inc. in Norwood, Massachusetts.

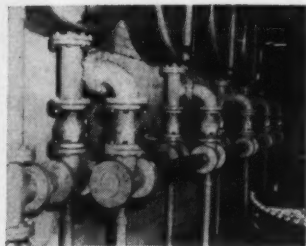
Since all oils to be produced would be processed through same manifold, positive valve action would be necessary in order to quickly switch from one type of processing to another. Valves with tight seal were desired in order to preclude accidental contamination

NEW SOLUTIONS

of one oil with another.

Solution: A total of 15 three- and four-inch ball valves were incorporated in the installation to control passage of lubricants throughout virtually every processing stage.

Each of five main filler tanks is fitted with a four-inch valve, made of carbon



Control of lubricant passages in a Bardehl oil-additive plant is maintained, in part, by 15 ball valves

steel with Teflon seats and seals. Also equipped with these valves is main manifold system which carries oils from filters to fillers.

Single three-inch valve regulates flow through rotary piston can-filler. In "off" position this valve is subjected to constant pump-generated pressure of 50 psi.

Results: Positive action of ball valves has permitted quick switching from one type of processing to another. Also, the valves' tight seal has prevented accidental contamination of one oil with another.

(Ball valves are products of Jamesbury Corp., 64 Millbrook St., Worcester 5, Mass.)

Check 1062 opposite last page.

Linear polyethylene resists hydrofluoric acid fumes

Problem: Corrosive fumes from reaction tanks in which rare-earth salts are treated at West Chicago works of Lindsay Chemical Division, American Potash & Chemical Corporation, caused rapid deterioration of vents.

In one case, involving treatment with fluorides, fumes and vapors carried from re-



UNIQUE CORN STARCH DERIVATIVE

It's industry's first cationic starch. Name: CATO.® It carries a cationic charge as an integral part of its polymeric structure. A strong affinity for negative surfaces results. As demonstrated by migration to the cathode of an electrophoresis cell.

CATO has other unusual starch properties, including greater clarity and increased stability. New applications appear month after month. As a size • stabilizer • binder • thickening agent • flocculant • retention aid • reinforcing agent.

CATO is now in production use in paper, textile and other industries. It may well answer some special need in your product or process. We'd be pleased to tell you more about CATO. Write, telling us something of the use you have in mind.

National

**STARCH and CHEMICAL
CORPORATION**

750 Third Avenue, New York 17
3641 So. Washtenaw Avenue, Chicago 32
735 Battery Street, San Francisco 11

Check 1063 opposite last page.



Whirlex Forced Draft

heavy duty fans are designed for service in all types of boiler and industrial applications. Special design airfoil impellers provide maximum static efficiency. All-welded housing construction allows for a dust-proof, leak-proof operation.



Whirlex Induced Draft

heavy duty fans are available with either straight or evase type self supporting stacks. Special shaft cooling sleeves allow for the efficient use of air cooled bearings. Water cooled bearings can be furnished if desired.

Write for complete information on these and other types of Whirlex industrial fans.

**Fly Ash
Arrestor Corp.**

200 N. 1st Street
BIRMINGHAM, ALA.



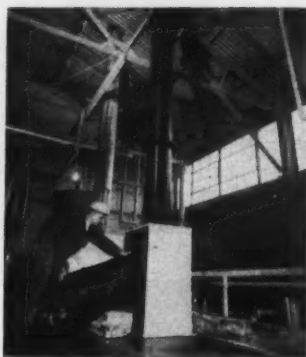
NEW SOLUTIONS

action tank consisted of hydrofluoric acid, plus traces of sulfuric, oxalic, and muriatic acids.

Many materials were tested. Some would resist hydrofluoric acid, but deteriorated from action of other trace acids.

One material which afforded good all-around resistance was too expensive for general use.

Solution: A stack assembly prefabricated from linear polyethylene was placed in service at Lindsay to handle the corrosive fumes. Stack is



Chemicals are added to reaction tank which is equipped with linear polyethylene stack to vent corrosive fumes

14½" in diam and 32' long. It has flanged connections which facilitate erection at job site. Later a similar stack was installed for another rare earth treatment process.

Results: Stack installed to cope with hydrofluoric acid and trace acids has been in service more than six months and shows no signs of corrosive attack. Stack on caustic reaction tank is expected to provide service far in excess of other materials.

Maintenance and replacement costs have been reduced. Lindsay management plans to convert more of its ducts, ventilating stacks, and similar equipment to linear polyethylene.

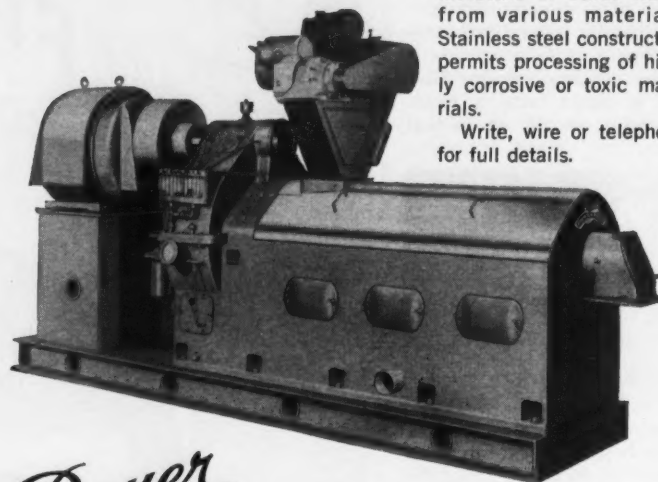
(Linear polyethylene ducts were fabricated by American Agile Corporation, 5461 Dunham Rd., Maple Heights, Ohio.)

Check 1065 opposite last page.

HAVE YOU A PRESSING PROBLEM?

Bauer Pressafiners are high pressure precision machines engineered specifically for the expression of moisture or other fluids from various materials. Stainless steel construction permits processing of highly corrosive or toxic materials.

Write, wire or telephone for full details.



Bauer

THE BAUER BROS. CO.

1728 SHERIDAN AVENUE • SPRINGFIELD, OHIO

Check 1066 opposite last page.



Ask for Bulletin 27

Wire Mesh Products

Cut engineering and production costs with Jelliff's facilities for precision-forming special filters and strainers in any quantity.


THE C. O. JELLIFF MANUFACTURING CORPORATION
SOUTHPORT, CONNECTICUT

SERVING INDUSTRY
FOR 78 YEARS



Check 1067 opposite last page.

CHEMICAL PROCESSING


**CHEMICAL
MATERIALS**

G. L. INNES, Division Manager
Chemical Sales and Development
and **DR. H. W. SCHULTZE**, Manager
New Chemical & Catalyst Development
Climax Molybdenum Company Div.,
American Metal Climax, Inc.

include molybdenum pentachloride; molybdenum hexacarbonyl; phospho-12-molybdic acid; silico-12-molybdic acid; molybdenum dichloride; molybdenum trichloride; molybdenum tribromide; tungsten hexachloride; tungsten hexacarbonyl; and tungsten pentabromide.

Molybdenum- and tungsten-containing catalysts have been used successfully in a variety of reactions. Different degrees of selectivity are achieved by changing compounds used, supports, and promoters. Among reactions of commercial significance that use molybdenum and tungsten catalysts are: oxidation; hydrogenation; chlorination; condensation and polymerization. Tests indicate that these materials also may be useful in dehydration, dehydrogenation, isomerization, cyclization, and alkylation.

Chemical synthesis is an

Up until a year ago only a few of these compounds were readily available for commercial use — molybdc oxide, molybdenum disulfide, ammonium molybdate, sodium molybdate, tungstic oxide, sodium tungstate, and tungstic acid. A few other could be obtained in limited quantities. Since then the list of readily available compounds has grown by addition of "key" intermediates — chemicals shown to be useful in laboratory investigation. This list will expand as interest in molybdenum and tungsten chemistry continues to rise.

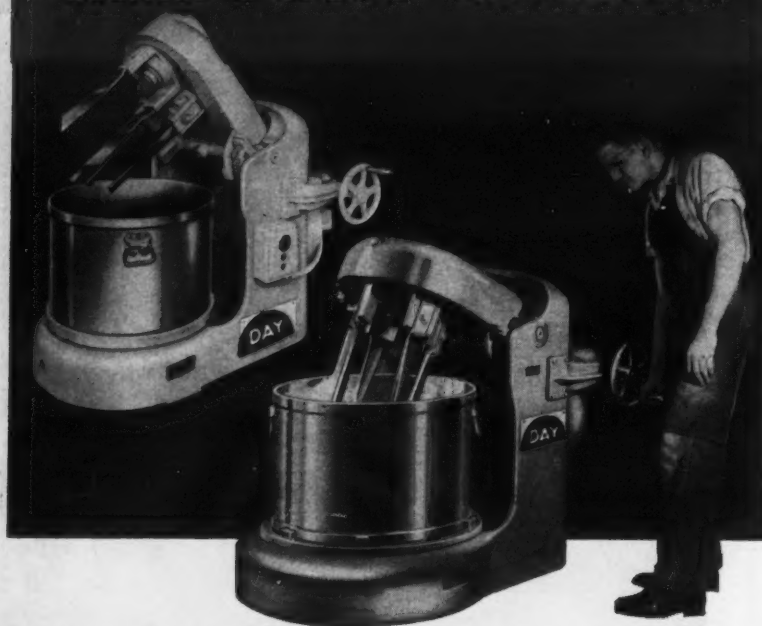
```

graph TD
    MS2_PURE([MoS2 (PURE)]) --> MOLY_CHLORIDES([MOLY CHLORIDES  
MoCl5])
    MS2_PURE --> MS2_TECHNICAL([MoS2 (TECHNICAL)])
    MS2_TECHNICAL --> MOLYBDENUM_COMPOUNDS[MOLYBDENUM COMPOUNDS]
    MOLYBDENUM_COMPOUNDS --> SODIUM_MOLYBDATE([SODIUM MOLYBDATE])
    MOLYBDENUM_COMPOUNDS --> AMMONIUM_MOLYBDATE([AMMONIUM MOLYBDATE])
    MOLYBDENUM_COMPOUNDS --> MO3_TECHNICAL([MoO3 (TECHNICAL)])
    MO3_TECHNICAL --> MO3_PURE([MoO3 (PURE)])
    MOLY_CHLORIDES --> MO_FILMS([Mo FILMS])
    MOLY_CHLORIDES --> MOLY_CARBOXYL([MOLY CARBOXYL  
Mo(CO)6])
    MOLY_CARBOXYL --> ORGANIC_MOLYBDENUM_COMPOUNDS([ORGANIC MOLYBDENUM  
COMPOUNDS])
    MO_FILMS --> MO_Si_FILMS([Mo-Si FILMS])
    MO_FILMS --> MO_C_FILMS([Mo-C FILMS])
    MO_FILMS --> MO_N_FILMS([Mo-N FILMS])
    SODIUM_MOLYBDATE --> HETEROPOLY_ACIDS_SALTS([HETEROPOLY ACIDS & SALTS])
    SODIUM_MOLYBDATE --> MOLYBDATE_SALTS([MOLYBDATE SALTS])
    AMMONIUM_MOLYBDATE --> AMMONIUM_THOMOLYBDATE([AMMONIUM THOMOLYBDATE])
    AMMONIUM_MOLYBDATE --> MOLYBDIC_ACID([MOLYBDIC ACID])
    AMMONIUM_MOLYBDATE --> MOLYBDENUM_METAL([MOLYBDENUM METAL])
    HETEROPOLY_ACIDS_SALTS --> SOLUBLE_XANTHATES([SOLUBLE XANTHATES])
    HETEROPOLY_ACIDS_SALTS --> SOLUBLE_OXALATES([SOLUBLE OXALATES])
    ORGANIC_MOLYBDENUM_COMPOUNDS --> SOLUBLE_XANTHATES
    ORGANIC_MOLYBDENUM_COMPOUNDS --> SOLUBLE_OXALATES
    AMMONIUM_THOMOLYBDATE --> HOMOGENEOUS_SOLUTION_CATALYSTS([HOMOGENEOUS  
SOLUTION CATALYSTS])
    MOLYBDIC_ACID --> HOMOGENEOUS_SOLUTION_CATALYSTS
    MOLYBDENUM_METAL --> HOMOGENEOUS_SOLUTION_CATALYSTS
    AMMONIUM_THOMOLYBDATE --> HETEROGENEOUS_SOLID_CATALYSTS([HETEROGENEOUS  
SOLID CATALYSTS])
    MOLYBDIC_ACID --> HETEROGENEOUS_SOLID_CATALYSTS
    MOLYBDENUM_METAL --> HETEROGENEOUS_SOLID_CATALYSTS
    AMMONIUM_THOMOLYBDATE --> HETEROGENEOUS_METAL_CATALYSTS([HETEROGENEOUS  
METAL CATALYSTS])
    MOLYBDIC_ACID --> HETEROGENEOUS_METAL_CATALYSTS
    MOLYBDENUM_METAL --> HETEROGENEOUS_METAL_CATALYSTS
    
```

55

Check the **PROFIT** of **DAY** **POINTS**

Gearless **PONY MIXERS**



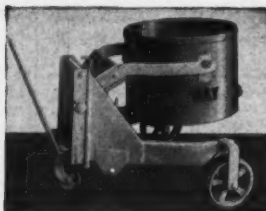
1. FAST, UNIFORM BLENDING of all ingredients being mixed. Agitator action insures against "dead spots" and stratification of materials—whether dry mixes, pastes or high viscosity liquids.

2. RUGGED, RIGID, TROUBLE-FREE construction makes DAY the standard of dependability. One piece cast frame assures absolute rigidity. Geared head motor drives agitators and can through roller chain and sprocket.

3. GUARANTEED PRODUCT PROTECTION from grease and oil. No bearings or stuffing boxes in the product zone.

4. QUICK, EASY REMOVAL OF AGITATORS from the batch. Counterbalanced head tilts easily by hand-wheel. Power tilting optional.

5. A MODEL FOR EVERY NEED with single motion or twin motion mixing action, one or two speed motors, in working capacities from 3 to 125 gals.



For full details, call in the Day field engineer in your area or write for Bulletin No. 500.

Mixer shown above, top, is Day Twin Motion Pony Mixer, having twin spindles with counter-rotating, overlapping blades. Shown immediately below is Day Single Motion Mixer. Day hydraulic lift trucks, left, and extra interchangeable cans, will further speed your production.

The J. H. DAY Co.

Division of The Cleveland Automatic Machine Co.

QUALITY MIXING, BLENDING, MILLING AND SIFTING MACHINES SINCE 1887

4952 Beech Street, Cincinnati 12, Ohio

On display at Chem Show — Booth 121-122

Check 1068 opposite last page.

CHEMICAL MATERIALS

area of great promise for moly and tungsten catalysts. For example, molybdenum chlorides have shown to be effective in chlorination of both aromatic and aliphatic compounds. They are not only more selective but in some systems significantly increase rate of chlorination.

Phospho and silico molybdic acids as well as phosphotungstic acid also loom as useful catalysts, although little work has been done. Distinguished by relatively large molecules with formula weights in the range of 2000-3000, they are extremely soluble in water and also in certain organic solvents. Several processes recently announced use heteropolymolybdates and tungstates in reactions for the production of plastics, pigments, and petrochemicals. They are used also in analytical chemistry, and medicine.

Some end-product fields where other moly and tungsten catalysts — halides; oxyhalides; heteropolymolybdates; tungstates; and the new "exotic" organo-molybdenum and -tungsten compounds — are expected to have a bright future include plastics, pigments, pharmaceuticals, synthetic rubbers, and a wide array of organic chemicals and intermediates.

Intermediates

As intermediates, molybdenum and tungsten chemicals have interesting possibilities. Only recently has industry cast a serious eye toward moly and tungsten chemicals in this field. Two materials in which interest is being shown are molybdenum pentachloride and tungsten hexachloride.

Various oxygenated organic compounds — carboxylic acids, alcohols, ethers, phenols, and ketones — partially replace the chlorines from these compounds. Resulting complexes have varying degrees of stability and solubility depending on solvent systems used. Same holds for nitrogen-containing and sulfur-containing analogs of organic compounds.

Hallco HA-5A

High Molecular Weight **Polymeric Plasticizer**

for use with
Vinyls
Cellulosics
Synthetic
Rubbers
Polymers

to prepare
Sheeting
Coated Fabrics
O-Rings
Molded Goods
Gaskets
Wire
Tapes
Cable

check these features

- Exceptional Permanence
- Excellent Compatibility
- Resistant to Ultra-Violet light
- Non-extractable
- Non-migratory



Ask for information
about other
Polymeric Plasticizers
available for
specific applications.

The C.P. Hall Co.
CHEMICAL MANUFACTURERS

5245 W. 73rd St., Chicago 38, Illinois
NEWARK • AKRON • CHICAGO
MEMPHIS • LOS ANGELES

Check 1069 opposite last page.

CHEMICAL PROCESSING

Both tungsten pentabromide and molybdenum dibromide are promising as intermediates for production of fully-substituted organo-metallic compounds. Molybdenum dichloride and trichloride, which have high melting points and unusual solubilities, may be useful in preparation of certain other organo-molybdenum compounds. Molybdenum hexacarbonyl and tungsten hexacarbonyl are key intermediates in preparation of "ferrocene"-type compounds (sandwich-type and open-sandwich-type). Variety of applications in which these are being tested indicates diversity of reactions which can be obtained.

Heteropolymolybdates and tungstates because of their replaceable hydrogens, acid strength, molecular size, and adsorbing power are also being examined.

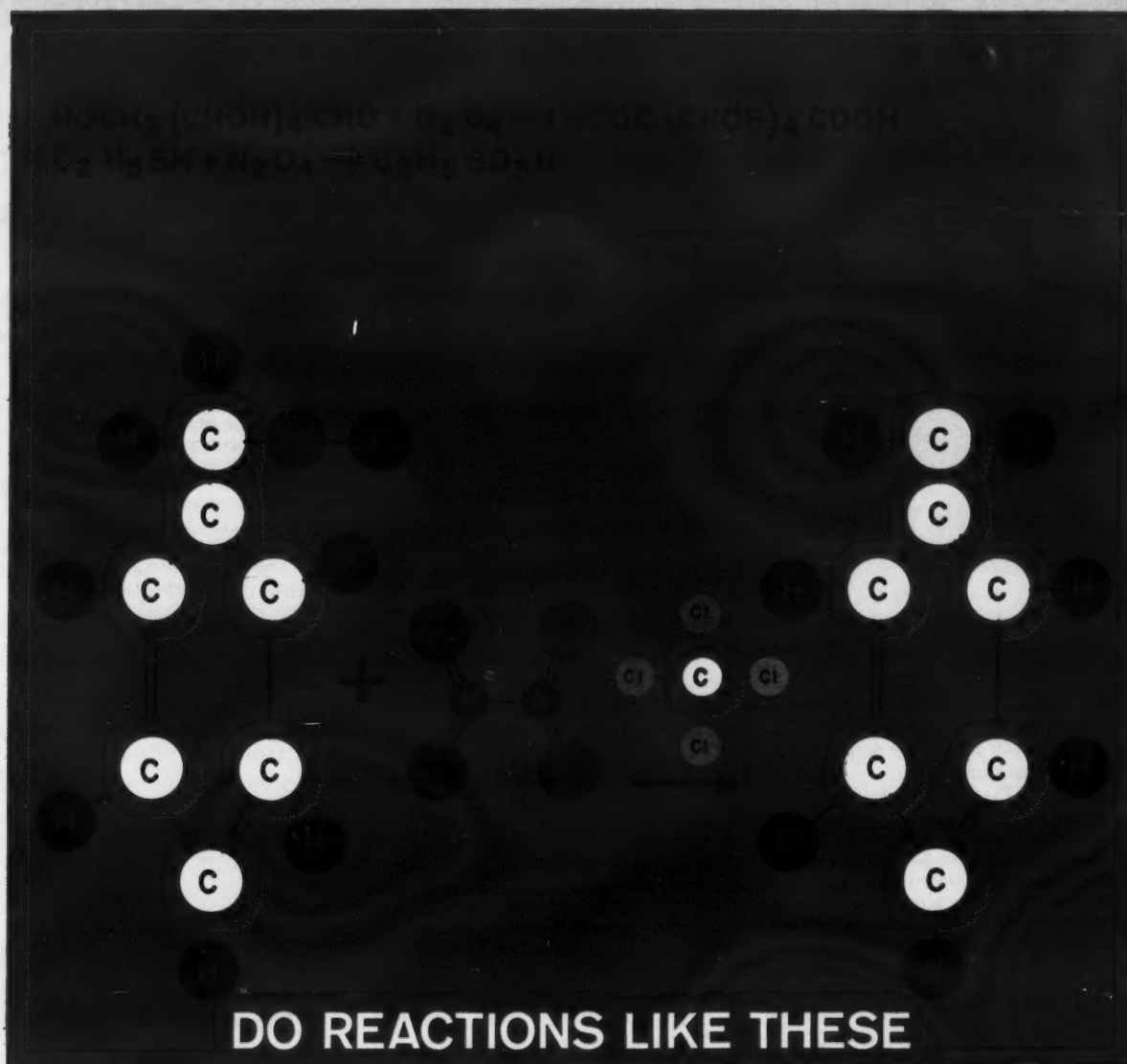
Corrosion Inhibition

Encouraging research findings have just been reported on the performance of molybdate and tungstate compounds in inhibiting corrosion. These materials, in fact, are comparable to chromate in their inhibitive properties and provide two distinct advantages. They are non-toxic and colorless.

Results of a recent research program reveal that sodium molybdate can be combined with orthophosphate to make a highly effective inhibitor which is much lower in cost than sodium molybdate alone. Up until now cost has been the major deterrent.

Inhibitive pigments represent another possible end use. In a recent study at a leading independent research institute, calcium molybdate out-performed red lead as a primer pigment in some instances. Molybdate pigments, with their low toxicity, might well be used in such applications as coatings for water tanks, water transmission lines, and food processing machinery.

One of the most firmly established fields of application for a molybdenum chemical is lubrication. Molybdenum di-



HOLD A LOW COST SOLUTION TO YOUR OXIDATION PROBLEMS?

Allied Nitrogen Tetroxide is a low-cost oxidant. It can be used in the wood pulping, rubber, metal recovery, and lubricant purification industries, and for many other applications. Perhaps this versatile chemical can solve some of *your* oxidation problems.

See the box at right for further reactions. For further information and application data on Allied Nitrogen Tetroxide, write for Allied's 59 page product bulletin "Nitrogen Tetroxide".

Allied Nitrogen Tetroxide is shipped in tank-cars, one-ton cylinders, or 125 and 150 pound cylinders.

NITROGEN TETROXIDE CAN BE USED AS A LOW COST OXIDIZER:

- ... At very low temperatures in the form of solutions, such as NO in N₂O₄
- ... In concentrated liquid form from -11° to 21°C
- ... In acids such as sulfuric and nitric
- ... As a gas in form of NO₂ at elevated temperatures
- ... As a solution in carbon tetrachloride or chloroform from 0° to 30°C for such oxidation reactions as:
- Aromatic alcohols to aromatic aldehydes;
- Alkyl aryl carbinols to ketones;
- Alcohol groups in starch or cellulose to carboxyl groups;
- Thiols to sulfonic acid.

For specifications and local offices, see our insert in Chemical Materials Catalog, pages 435 - 442 and in Chemical Week Buyers Guide, pages 35 - 42.

BASIC TO
AMERICA'S
PROGRESS

2819

NITROGEN DIVISION

Dept. NT13-2-1, 40 Rector Street, New York 6, N. Y.

Check 1070 opposite last page.

TRULY LINEAR ROTAMETER FLOW TRANSMITTER

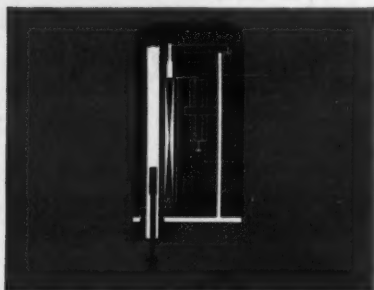


Compatible With Any AC or DC Control Instrument

Brooks' new MPT-52 Electric Flow Transmitter* is remarkably adaptable. You can use it with any indicating, recording or control instrument . . . from a simple DC microammeter on up to the most sophisticated electronic unit. Just name the instrument, and Brooks will supply the proper transmitter package.

The MPT-52 is remarkable in other ways, too. It gives a linear signal based on actual flow rate—not float position. A unique flow-sensing cam in the transmitter does the trick: shaped according to the actual flow curve of the rotameter, it accurately transmits the meter's flow characteristics.

Designed to meet UL requirements for Class 1, Group D, Div. 1 hazardous locations, the MPT-52 is un-



affected by vibration, extreme changes in ambient temperature, or dirty and corrosive atmospheres.

BULLETIN 170 gives full details. Write for a copy. *Pat. Pend.

BROOKS ROTAMETER COMPANY



1059 A STREET
LANSDALE, PA.

U.S.A. 1950

Check 1071 opposite last page.

CHEMICAL MATERIALS

sulfide (MoS_2) has been found very effective as an additive in hundreds of lubricant formulations, and most recently has invaded the high volume passenger car chassis grease market. This chemical sustains lubrication thanks to its unique combination of properties. It provides a strong, durable film, maintains a low coefficient of friction, remains thermally stable, and resists chemical attack.

Remote to the chemical processing industry, but highly interesting, is use of molybdenum compounds as trace elements in agriculture. These materials have been found useful in treating crops to increase yields and control troublesome deficiency diseases. Initially, the general method of application was as a top-dressing for soils, with sodium molybdate most widely used for this purpose. Just recently, however, a technique was introduced in which seed is treated before planting, increasing efficiency and reducing application costs.

Bright Future

Other fields where molybdenum and tungsten chemicals either are presently used or exhibit good potential include ceramics, metals treatment, pigments, and dyes. New fields of application where indications are that certain new moly or tungsten compounds might be effective are: anti-knock agents for gasoline; semi-conductors for high temperature use; improved lubricating oil additives and corrosion inhibitors; and many more.

Numerous processing problems arising from advanced technology provide a distinct challenge to the vast families of molybdenum and tungsten chemicals. With imaginative engineering, these materials should prove increasingly valuable.

(Molybdenum and tungsten compounds are available from Climax Molybdenum Co., Div., American Metal Climax Inc., 500 Fifth Ave., New York 36, New York.)

Check 1072 opposite last page.

Getting to the Source of your Odor Problems!

Effective odor control can be accomplished only when experience and proper facilities are combined to attack the problem at its source. That is the best reason for bringing your odor problems to Sindar specialists.

For masking ill-smelling ingredients or adding sales-stimulating fragrances, custom-made scents designed to meet specific production needs and odor preferences are available. For other causes of odor, such as oxidation and bacterial decomposition, the best solutions are Sindar stabilizers, antioxidants, fungicides and germicides.

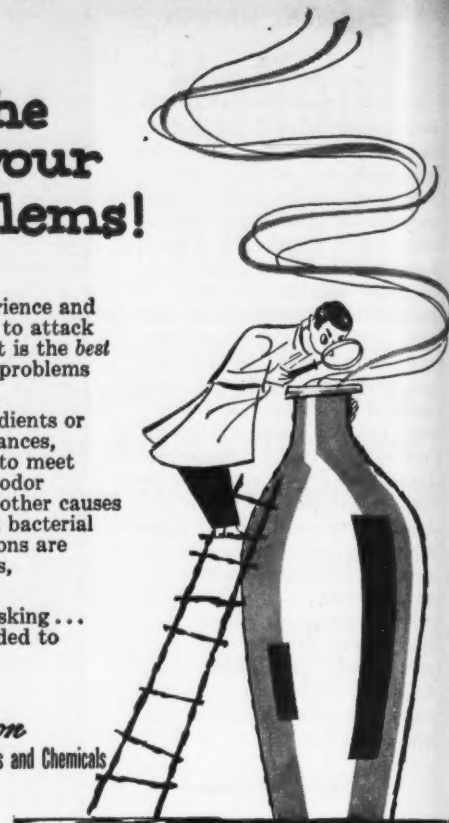
Our service . . . yours for the asking . . . may be just the approach needed to solve your odor problems.

SINDAR Corporation
Industrial Aromatics and Chemicals

321 West 44th Street

New York 36, N. Y.

Check 1073 opposite last page.



CARDOX[®] For CARBON DIOXIDE

LIQUID, GAS, DRY ICE
65 conveniently located CO_2 Supply Depots
and fleets of trucks and rail tank cars insure
reliable service and supply.

CARDOX DIVISION OF CHEMETRON CORPORATION
Dept. 622, 840 N. Michigan Ave., Chicago 11, Ill.

CHEMETRON

REGIONAL OFFICES: Jersey City, N. J.
7th & Provost Sts.
Memphis, Tenn.
784 Mississippi St.

Detroit, Mich.
1723 W. Lafayette Blvd.
Chicago 9, Illinois
43rd & Marshfield

St. Louis, Mo.
3123 N. Broadway
Fort Worth, Texas
825 N. Calhoun St.
Los Angeles, Cal.
151 North Avenue 19

Check 1074 opposite last page.

CHEMICAL PROCESSING

Thickener has viscosity exceeding 20,000 cps at 2% concentration

Type useful for stabilizing all aqueous systems

Uses: As water-soluble stabilizer and thickener in preparation of water-based emulsion paints, preparation of polyvinyl-acetate emulsions, textile warp and finish sizes, paper coatings and paper sizings, ceramics, inks, and latex emulsions for adhesives and coatings.

Features: Viscosity types range up to one exceeding 20,000 cps at 2% concentration—extremely high for a non-ionic water-soluble hydroxyethyl ether of cellulose. Produces clear, smooth, sparkling solutions without haze or color, and it is available in granular form which minimizes dusting and lumping as well as improving dispersibility.

Description: Available in four viscosity types, highest of which is useful for stabilizing and thickening all types of aqueous systems. Relatively unaffected by presence of salts, acids, or alkalis in solution, it is compatible with gums and latices.

Low-viscosity types are used as polymerization stabilizers in preparation of vinyl acetate homopolymers and copolymers.

Derivative is useful binder for ceramic colors, glazes, and refractory compositions due to low-temperature burnout properties. It also has potential in fields of water-soluble inks and other water-resistant films and coatings due to its ready insolubilization by resins and other reagents.

(Natosol 250 is development of Hercules Powder Company, 900-940 Market St., Wilmington 99, Del.)

Check 1075 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

BRIEFS

- on a new form of benzoic acid
- a strategic way to buy alkalies
- finding a "new" intermediate

Crystallized benzoic acid is sneezeless—flows and dissolves faster

Customers told us there were three ways to improve benzoic acid. Make it dissolve faster. Make it freer flowing. Get rid of irritating fines.

We've done all three with benzoic acid, *crystal*.

You can get this crystal form in both U.S.P. and technical grades. The U.S.P. grade assays 99.3% min. The technical grade is at least 98.0% pure. Water content assays not over 0.2%.

Check the coupon for more data on benzoic acid and its chemical cousin, sodium benzoate, which we also supply in U.S.P. and technical grades.

P.S. You CAN still get the powdered form of benzoic acid if you like. It comes in the same grades and assays the same as the crystal form.



32 ways to buy alkalies

When you have a wide choice of forms and grades of caustic soda, caustic potash, and carbonate of potash, you can gear your purchasing closely to your process or product needs.

You can buy Hooker caustic soda 12 ways, Nialk® caustic potash 13 ways, and Nialk carbonate of potash 7 ways.

Your Hooker contact can help you regarding all forms, grades, and shipping methods.

For descriptive data sheets, just check the coupon.

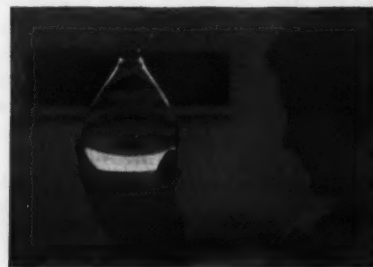
How to look for a "new" intermediate

Ever spend weeks trying to develop a new intermediate for a project, only to find it has been around all the time?

Maybe you want a new polymerization modifier, for example. Your work points to a mercaptan structure that freezes below 0°C and boils over 100°C, has light color, little odor.

Well, we have been making it all along. We call it lauryl mercaptan.

The coupon tells how to get the data sheet.



For more information, check here and mail with your name, title, and company address.

- ☐ Benzoic Acid ☐ Caustic Potash ☐ Caustic Soda
☐ Carbonate of Potash ☐ Lauryl Mercaptan

When requesting samples, please use business letterhead to speed delivery.

HOOKEER CHEMICAL CORPORATION

510 FORTY-SEVENTH STREET, NIAGARA FALLS, N. Y.

Sales Offices: Chicago Detroit Los Angeles New York
Niagara Falls Philadelphia Tacoma Worcester, Mass.
In Canada: Hooker Chemicals Limited, North Vancouver, B. C.

HOOKEER
CHEMICALS
PLASTICS

Check 1076 opposite last page.

SOME FACTS AND FALLACIES ABOUT PACKED TOWERS

☒ **Packed towers are practical in diameters over 3 ft.**

TRUE. Modern tower packings, such as "Intalox"® saddles and metal Pall Rings have made an old "rule-of-thumb" obsolete. Formerly, engineers were hesitant to use packed towers over three feet in diameter, especially where distillation was involved. However, the high efficiencies and low pressure drops of these new packings have made large diameter towers a practical and economical mass transfer tool. We can cite distillation, absorption and even liquid-liquid extraction towers in successful operation whose diameters run 8 ft. or more.

☒ **Packed towers give higher pressure drops than tray columns.**

FALSE. Because of their low pressure drops, "Intalox" saddles and metal Pall Rings have found wide application in vacuum distillation. In these rather critical rectifications, metal Pall Rings, especially, have such low resistance that pot temperatures—and product pyrolysis—are maintained at a minimum. Moreover, these low pressure drop properties lead to smaller tower diameters with greater liquid irrigation densities and lower H.E.T.P.

YES, the introduction a few years ago of "Intalox" saddles, and, more recently, the metal Pall Ring, used with properly designed packed tower internals, has brought about a re-evaluation of methods used to effect mass transfer . . . have made yesterday's facts, today's fallacies. In new tower design, or to obtain greater capacity or better efficiency from present towers, it will pay you to investigate modern packed tower performance.

Are you on our mailing list to receive new technical data on packed tower performance as it is released from our experimental laboratories? If not, drop us a note on your letterhead. No cost or obligation. Write Dept. CP1059, The U. S. Stoneware Co., Akron 9, Ohio.

☒ **Packed towers have lower first cost than tray towers.**

TRUE. Again, this is true because of the development in recent years of unique packing shapes. Their high capacity and greater mass transfer efficiencies permit the design of shorter and narrower columns, requiring smaller fluid moving equipment. Where corrosion is a factor, the low cost of chemically inert ceramic packings means impressive savings over the cost of special corrosion-resistant alloys.

☒ **Packed beds make efficient entrainment separators.**

TRUE. Mist elimination sections consisting of packed beds are used in commercial scrubbing equipment, even where the scrubbing sections themselves consist of trays. Moreover, the chemical engineering literature quotes many actual installations in sulphuric acid and other plants where satisfactory performance is being obtained from packed beds. Where fouling is a problem, the choice of the proper packing with a large interstitial free space, combined with adequate hydraulic radius, will prevent deposition of solids and thus maintain low pressure drop.

☒ **Performance of packed towers can't be predicted accurately.**

FALSE. Today packed tower performance can be predicted about as accurately as that of plate columns. That was not true, however, ten years ago. Accurate design data are multiplying rapidly as the use of packed columns continues to grow at a rapid pace. Extensive research being made in packed towers up to 30" in diameter is providing data that can be used to predict the performance of towers up to 25' or more with reasonable accuracy.


U. S. STONEWARE
AKRON 9, OHIO



CHEMICAL MATERIALS

Solvents shrugged off by masterbatch base

Uses: Formulation of compounds from masterbatch permits rubber fabricator wide latitude in design of solvent-resistant silicone-rubber parts. Such goods can be manufactured into finished products by all conventional means such as molding, extruding, calendering, and dispersion-coating.

Features: Rubbers made from base provide good resistance to various fuels and solvents, including chlorinated, aromatic, and aliphatic types. Operating-temperature range is -80 to +500°F.

Description: Silicone-rubber base is masterbatch containing a solvent-resistant fluorocarbon silicone-rubber polymer, compounded with 16% of reinforcing silica.

Base accepts fillers easily. It can be processed by same methods used for regular silicone-rubber bases. Product can be colored to almost any desired shade.

Specific gravity of silicone-rubber base is 1.38. Brittle point is -90°F. Shelf life at room temperature is at least two months.

(Silastic LS-422 base is product of Dow Corning Corporation, Midland, Mich.)

Check 1078 opposite last page.

Aluminum hydroxide gel offers high Al₂O₃

Uses: Dyeing mordant, filtering medium, paper sizing, water purification, and as chemical intermediate.

Features: Due to low anion portion, aluminum hydroxide gel flakes contain 45% active Al₂O₃.

Description: White, finely dispersed flaked salt, alumina gel is readily soluble in cold water. As concentrations are increased, solutions become more viscous.

(Aluminum hydroxide gel flakes are distributed by Westco Chemicals, Inc., 6850 Tujunga Ave., North Hollywood, Cal.)

Check 1079 opposite last page.

CHEMICAL PROCESSING

THAT'S
INTERESTING

**Tiny
TV camera
inspects welds**

Development of a TV camera only 2 3/4" in diameter makes possible critical inspection of welds inside reactor tubes just 3" in diameter.

Camera is product of Diamond Power Specialty Corporation, Lancaster, Ohio.

No foolin'?

Even monkeys aren't immune to one of man's occupational diseases—ulcers. Experiments at University of California's Medical School show simians subjected to experimental pressures about equal to those of business executives develop stomach ulcers.

**Ultra-sonic
world flight**

Within 40 years, space experts predict, man may travel almost 670 million mph. Thus it would take him only 0.134 of a second to whirl around the world.

For more information on product at right, specify 1080 see information request blank opposite last page.



Which of these 3 products and services can you use from BECCO?



**What's new in
Metal Treatments
and Etching?**

Quite a few things. For example, there's the use of Becco Ammonium Persulfate in etching printed circuits. Seems the material works a lot better—at less cost—and with none of the hazards of the ferric chloride solutions conventionally used.

Then, there's the problem of pickling copper and brass. Lots of pickling agents will do this—only trouble is, you've got to paint or plate or do whatever you're going to do with the metal rather quickly. Or else. Or else it will tarnish or oxidize and you're in the pickle all over again.

Not so with Ammonium Persulfate. Cleans fine. Puts a mild etch on the surface, too, for better paint or plating bonding. More important, perhaps, is the fact that the metal resists retarnishing for up to two weeks. Ideas?

We hope so. What's more, we've got several booklets to help spur you on. They're free—use the coupon below to order.

No. 39 and 51—Surface Treatment of Metals with Peroxygen Compounds.

No. 86—Improving Properties of Copper and Brass Surfaces.

No. 97—Paddle Etching of Printed Circuits with Ammonium Persulfate.

No. 99—Tank Immersion Etching of Printed Circuits with Ammonium Persulfate.

No. 102—Etching of Printed Circuits with Mercury Activated Persulfate.



**What's a
PEROXYGEN?**

Fact is, "peroxygen" is a word that Becco uses to indicate that we can tie oxygen onto just about anything.

How come? Well, years of experience in producing Hydrogen Peroxide has produced an affinity between Becco and oxygen—an affinity we have capitalized on to give you compounds that will provide a ready source of oxygen—wherever, however and whenever you need it.

We have a good number of such compounds on the shelves. Quite a few others are in development. Still others are merely in our minds, but we can begin drawing them out if you're interested.

We hope you are interested. But we'll never know—unless you fill in the coupon below and mail it to us. Why not?

**Problems
in handling
Hydrogen
Peroxide**



Becco's Four-Fold Engineering Service Program—offered free—includes:

1. Comprehensive survey of your facilities.
2. Specific proposal with recommendation of proved equipment and where it is obtainable.
3. Installation supervision by Becco.
4. Periodic inspection and permanent service.

Can you use this free Becco help, based on more years of experience with bulk handling of H₂O₂ than any other manufacturer? Use the coupon to let us know.

BECCO 

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York

Dept. CP-E

Gentlemen:

Please send me the following free bulletins:

- ☐ 39 and 51 ☐ 86
☐ 97 ☐ 102 ☐ 99

NAME _____

FIRM _____

ADDRESS _____

CITY _____

ZONE _____ STATE _____

BECCO 

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York

Dept. CP-D

Gentlemen:

Send me more information about Becco Peroxygen Chemicals.

NAME _____

FIRM _____

ADDRESS _____

CITY _____

ZONE _____ STATE _____

BECCO 

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York

Dept. CP-B

Gentlemen:

Please tell me more about your Four-Fold Engineering Service.

NAME _____

FIRM _____

ADDRESS _____

CITY _____

ZONE _____ STATE _____

SAVE ON FILTER MEDIA OF ALL TYPES

...with LAMPORTS JOB ENGINEERING

With hundreds of different fibers, constructions and grades of filter media available, it takes a specialist to guide you to the most efficient and economical material for any given job. Lamports engineers are qualified by years of experience in the field to advise you on any filtration problem. Double-check your present media with us, or let us help you plan your next installation. Technical assistance without obligation. Call, write, wire, or TWX.

THE filter media are the **HEART**
of the filtration system!

Lamports
COMPANY

1405 W. Sixth Street • Cleveland 13, Ohio

Phone: MA 1-3315 Teletype CV-768

Check 1081 opposite last page.

DAWE'S a dependable source for SODIUM GLUCONATE and GLUCONIC ACID

Promptly available in any quantity.

Warehouse stocks across the country.

Dawe's high quality is assured.

Write for technical data and samples.

**DAWE'S
LABORATORIES, INC.**
4800 South Richmond Street
Chicago 32, Illinois

Dawe's

Check 1082 opposite last page.

CHEMICAL MATERIALS

Polyester resins approach end-use characteristics of epoxies

Uses: Fabrication of chemical-resistant tanks. Also, applications in textile and pulp and paper equipment, where corrosion, may be factor.

Features: Certain end-use characteristics of polyester resin approach those of epoxies. Product exhibits good resistance to water, acids, and alkalis, especially at elevated temperatures. Heat-distortion temperature is 285°F.

Description: Polyester resin is based on bisphenol derivative reacted with fumaric or maleic anhydride. Temperature-viscosity-gelation characteristics make resin good material for preparation of polyester molding compounds.

(Atlac L-382-13 polyester resin is product of Chemicals Division, Atlas Powder Co., Wilmington 99, Del.)

Check 1083 opposite last page.

Organic sulfur has high chain-transfer constant

Recently developed organic sulfur, benzyl mercaptan (a-Toluenethiol) $\text{CH}_2 - \text{SH}$, has chain-transfer constant of 25.5. White liquid of 99% purity can be used to form 4-amino glyoxalines through thioimide as intermediate. Resulting compounds are of interest as potential antihistamines.

Properties of benzyl mercaptan are as follows:

Molecular weight	124.19
Density @ 20°C	1.058
pK Ionization	11.8

(Benzyl mercaptan is product of Evans Chemetics Inc., 250 E. 43rd St., New York 17, New York.)

Check 1084 opposite last page.

White mineral oils of special variety used in plastics industry are described in bulletin, which gives application and test data of materials. Tech Data File F-42—L. Sonneborn Sons, Inc., 300 Fourth Ave., New York 10, N.Y.

Check 1085 opposite last page.

SAMPLING SIMPLIFIED!

Versatile, Light-weight

"GOLDEN THIEF" VACUUM PUMP

Gets Pure Samples FAST . . .

Without Contamination!

At last . . . a quick, easy way to "steal" pure samples—even from places inaccessible to other pumps! Revolutionary, low-cost "GOLDEN THIEF" is ideal where contamination must be avoided and where highly-corrosive fluids are involved. Lift is approximately 25 feet of water at sea level. Pump handles liquids up to consistency of syrup, as well as powdered solids that have a tendency to "slump" or seek their own level. Samples pass through plastic tubing — never come in contact with any part of pump.

Model D shown is available in stainless steel or aluminum, with parts inter-changeable. Neck-opening sizes from 22 mm. to wide-mouth jars. Unit is easy to clean, requires minimum maintenance.

Write for illustrated brochure.

W & W Manufacturing Company
526 S. Dearborn Street, Chicago 5, Illinois

Check 1086 opposite last page.

Suppliers
to the industry
Tamms

... SUPPLIERS OF IMPORTANT
POLISH INGREDIENTS OF UNIFORM
GRADE AND TOP QUALITY

000 MULTICEL (DIATOMACEOUS
EARTH)

SILICA (SOFT AMORPHOUS)

TRIPOLI (ROSE AND CREAM COLOR)

BENTONITE

RED OXIDE

TAMMS INDUSTRIES CO.

RM-7 — 228 N. LA SALLE ST. CHICAGO 1, ILL.

Check 1087 opposite last page.

CHEMICAL PROCESSING

U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

New Sodium Hydride Analysis Developed

A new and unconventional method of analyzing sodium hydride for contained sodium hydride and residual sodium was developed recently at the U.S.I. research laboratories.

The determination of completeness of reaction between sodium and hydrogen to form the hydride presents a problem because of the reactivity of the latter with air and moisture. Sampling is difficult and conventional analytical procedures are inadequate since both sodium and sodium hydride yield hydrogen and caustic when treated with water.

The method developed by U.S.I., however, is actually based on the differential amounts of hydrogen and caustic formed when sodium hydride containing small amounts of sodium is treated with water in a decomposition flask.

The sample need not be weighed if only the relative amounts of sodium and sodium hydride are desired. Accuracy depends on rigorous sampling, and the best method involves the use of a small 10cc. hypodermic syringe.

Weight of sample can be obtained, if desired, by weighing the syringe (with material being analyzed) before and after introducing the sample into the decomposition flask.

A data sheet giving complete details on this method of analysis and a diagram of the apparatus can be obtained from U.S.I. upon request. Production of sodium hydride from dispersed sodium is outlined in U.S.I. Sodium Dispersions brochure, also available on request.

New Zirconium-Copper Alloy Now on Market

A recently developed zirconium-copper alloy, said to possess excellent electrical conductivity and high-temperature strength properties, is expected to find many applications in the electrical field. The new alloy consists of high-conductivity, oxygen-free copper and carefully controlled concentrations of high-purity zirconium.

It is distinguished by the high strength level it develops through cold working and the extent to which it retains this strength at elevated temperatures. A typical bar of the alloy, cold-worked 60% and aged for one hour at 400°C, exhibits the following: tensile strength, 63,000 psi; yield strength, 59,000 psi; elongation, 12%; electrical conductivity, 90-95%. At 400°C, the short time tensile strength is 46,500 psi. Additional cold-working will increase the strength of the alloy without sacrificing ductility and electrical conductivity. Endurance tests show it to be far superior to unalloyed copper.

The high softening temperature of the alloy permits welding, brazing, silver soldering. Silver plating is also practical with only minor modifications in procedures. Billets cast with the new alloy are reported to be free of inclusions and flaws — hence have better hot and cold workability.

First Interim Regulations On Tax-Free and SD Alcohols Implement 1958 "Changes" Act

Continuing Industrial Use Permit Is One of Major Changes.

The first interim regulations written to implement the Excise Tax Technical Changes Act of 1958 (Public Law 85-859, 72 Stat. 1313), which went into effect July 1 this year, were published in the Federal Register of June 12. These regula-

tions provide for administration of the Internal Revenue Code of 1954 as amended by the "Changes" Act, and will be effective until superseded by permanent regulations.

The following changes are significant for users of pure and specially denatured ethyl alcohols:

- (1) *Industrial Use Permits* — permits to use SD Alcohol, Form 1481 and Tax-Free Alcohol, Form 1447, issued effective on or after July 1, are continuing (unless terminated by the terms thereof, suspended, revoked or voluntarily surrendered). It was formerly necessary that these permits be renewed each year.
- (2) *Withdrawal Permits* — issued on or after July 1 expire as follows: SD Alcohol, Form 1485, expires October 31, 1960; Tax-Free Alcohol, Form 1450, expires April 30, 1961. It was formerly necessary to obtain new permits each year.
- (3) *Use of Tax-Free Alcohol* has been extended to include blood banks, educational organizations exempt from federal income tax, pathological laboratories with certain restrictions. The blood banks were not previously specified. The restrictions of use by various institutions have been clarified.

MORE



What's Cooking? World's first all-titanium frying pan is being used here by Jean Gregoire, executive chef of New York's Hotel Roosevelt, to fry eggs for hungry patrons. The experimental pan was fabricated by Mallory-Sharon Metals Corporation, Niles, Ohio (one-third owned by U.S.I.), as part of a nationwide program to promote uses for the light, strong, corrosion-resistant metal.

Ethanol Widely Used in Pharmaceutical Aerosols

Medicine in aerosol form, for therapy by inhalation, has gained considerable acceptance in the last few years. There is much well-documented clinical evidence for the suitability of aerosols in the treatment of asthma, for example. And as new aerosol formulations are developed and tested clinically, it is expected that this form of inhalation therapy will be used even more widely in the future.

Judging from a group of typical formulations published recently by *Drug and Cosmetic Industry Magazine*, ethyl alcohol is an essential ingredient in this type of pharmaceutical aerosol. Examples of bronchodilator amine

MORE

AEC OKs Operation at Full Power for World's Largest Private Research Reactor

The largest independent industrial research reactor in the world is now being operated by Industrial Reactor Laboratories, Inc. at Plainsboro, N. J., for U.S.I. and nine other companies. After extensive safety tests, the Atomic Energy Commission recently authorized operation of the reactor at its full design power level of 5,000 kilowatts (thermal).

Previously the facility had been granted authority to operate at power levels not exceeding 100 kilowatts during tests which included stringent safety studies. Upon completing these tests, the AEC supplemented its amendment to IRL's license. It now states that, in the opinion of the Commission's hazards evaluation branch, the reactor can be operated at the five megawatts rate without undue hazard to the health and safety of the public.

U.S.I. CHEMICAL NEWS

CONTINUED

Alcohol Regulations

(4) *Samples* — proprietors may now furnish without permits samples of SD Alcohol of one quart to users, applicants or prospective applicants for permits (for experimental purposes or preparation of samples to be submitted to the Director). Previously only samples up to eight ounces could be furnished without permits.

(5) *Carrier Permits* — permits are no longer required to transport tax-free, specially denatured and undenatured alcohol, including tax-free distilled spirits.

As further interim regulations are published, U.S.I. will endeavor to keep industrial alcohol users informed as to the important changes.

CONTINUED

Aerosols

formulations included one containing:

Isoproterenol HCl	0.20%
Water	2.00%
Ethanol (absolute)	37.80%
Propellants	60.00%

Typical cardiovascular drug formulations in-

cluded the following:

Nicotine	1.00%
Ethanol 95%	34.00%
Propellants	65.00%

And an antispasmodic formulation given contained:

Atropine	0.1%
Ethanol 95%	9.9%
Propellants	90.0%

U.S.I. Appoints New Sales Manager for Detroit Office

On September 30th, Fred M. Henley retires as Manager of the U.S.I. Detroit Sales Division, after a long and successful career with the company. Succeeding Mr. Henley is Walter J. Kilmer, who has been associated with U.S.I. for 25 years as a sales representative for the company in the Buffalo, N. Y., area.



W. J. KILMER

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

New cleaning agent claimed to combine functions of solvent and detergent can now be obtained. Has low volatility, no flashpoint. Forms clear solutions with water, all chlorinated solvents, most safety solvents. **No. 1510**

New periodical on biochemical and biophysical research now being published and sold. Said to meet need for rapid dissemination of information in experimental biology. Information appears as short, well-documented communications. **No. 1511**

Water-soluble anti-caking agent said to be effective in concentrations as low as 0.025-0.05%, is now on market. Material is organic, practically salt-free. Available as 98% powder and 50% free-flowing liquid. **No. 1512**

Simple slide rule for polyethylene film and bag measurements has been developed. Permits rapid determination of width, length, total area, weight, gauge in one setting of the rule, with only one or two constants known. **No. 1513**

Diethylaminoethyl phenylethyl acetate citrate has been found, in new research, to exhibit stronger, faster broncho-dilating action than ephedrin. Cough reflex is stopped more effectively than by codeine. **No. 1514**

Chemistry of drugs is covered in new book now being sold. Both synthetic and natural drugs are discussed as to structure, preparation and synthesis, properties, uses. A table gives approved, chemical and proprietary names. **No. 1515**

New fatty-nitrogen-derived corrosion inhibitor has been developed for use in 5, 10, 15% HCl over a wide temperature range. Claimed to control corrosion on metals such as stainless steels 316 and 420, monel, bronze, mild steel. **No. 1516**

Objective measurement of odor is said to have been achieved by techniques which use the latest in ionization detector gas chromatography equipment. Permits correlation between subjective and objective odor evaluation. **No. 1517**

First chewable iron tablet for children has been introduced. Contains ferrous fumarate and vitamin C and will not stain teeth, according to manufacturer. Intended for oral treatment or iron deficiency anemia. **No. 1518**

All-polyethylene chemical pump for dispensing from drums, carboys, etc. can now be obtained. Said to operate with ease and wear-free smoothness, due to special valve design. Furnished with drum-bung adapter. **No. 1519**

U.S.I. at the International Plastics Show



U.S.I.'s booth at the International Plastics Exhibition was the background for the opening ceremony, June 17th, in Grand Hall, Olympia, London.

PRODUCTS OF U.S.I.

Alcohols: Ethyl (pure and all denatured formulas); Anhydrous and Regular Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL® PB.

Organic Solvents and Intermediates: Normal Butyl Alcohol, Amyl Alcohol, Fusel Oil, Ethyl Acetate, Normal Butyl Acetate, Diethyl Carbonate, DIATOL®, Diethyl Oxalate, Ethyl Ether, Acetone, Acetoacetanilide, Acetoacet-Ortho-Chloranilide, Acetoacet-Ortho-Toluidide, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Sodium Oxalacetate, Sodium Ethylate, Urethan U.S.P. (Ethyl Carbamate), Riboflavin U.S.P.

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Urethan USP, Intermediates.

Heavy Chemicals: Anhydrous Ammonia, Ammonium Nitrate, Nitric Acid, Nitrogen Fertilizer Solutions, Phosphatic Fertilizer Solution, Sulfuric Acid, Caustic Soda, Chlorine, Metallic Sodium, Sodium Peroxide.

PETROTHENE® Polyethylene Resins

Animal Feed Products: Antibiotic Feed Supplements, Calcium Pantothenate, Choline Chloride, Special Liquid CURBAY, Menadione (Vitamin K₃), DL-Methionine, MOREA® Premix, Riboflavin Products, U.S.I. Premadry, Vitamin B₁₂ Feed Supplements, Vitamin D₃.



INDUSTRIAL CHEMICALS CO.

Division of National Distillers and Chemical Corporation
99 Park Avenue, New York 16, N. Y.

U.S.I. SALES OFFICES

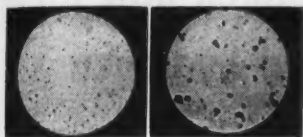
Atlanta • Baltimore • Boston • Chicago • Cincinnati • Cleveland
Detroit • Kansas City, Mo. • Los Angeles • Louisville • Minneapolis
New Orleans • New York • Philadelphia • St. Louis • San Francisco

CHEMICAL MATERIALS

Coverage 80% greater with MoS₂ powder

Uses: Molybdenum disulfide additive for greases and oils.

Features: Finer particles in pre-wetted dispersion provide 80% greater hiding power without increasing solid contents.



Photomicrograph comparison (enlarged 640 times) shows finer particles in pre-wetted dispersion (left) as compared to MoS₂ powder

Description: Dispersion can be handled, measured, and blended easily, according to manufacturer.

Range of applications can be extended to closer-tolerance mechanisms by reducing the solids content, thus increasing additive's effectiveness.

('dag' 208 is product of Acheson Colloids Company, division of Acheson Industries, Inc., Port Huron, Mich.)

Check 1088 opposite last page.

Bonds dissimilar plastics, plastics to non-plastics

High degree of adhesion between variety of surfaces is provided by vinyl adhesive through non-crystallizing, permanent, flexible bond.

Suitable for cementing dissimilar plastics, and plastics to non-plastics, the adhesive has a clear vinyl base with very high solids content. It may be used as wet bonding agent, and as contact cement.

(Rez-N-Glue is manufactured by Schwartz Chemical Co., Inc., 50-01 Second St., Long Island City 1, N.Y.)

Check 1089 opposite last page.

For more information on product at left, specify 1090 . . . see information request blank opposite last page.



One of the world's largest producers of **METHANOL**

Produced at Commercial Solvents Corporation's Sterlington Plant in Louisiana. Delivered fast wherever you are located. Strategically situated bulk distribution points and service offices coast-to-coast guarantee delivery by tanker, barge, tank car, tank truck and drums—when wanted.

Call on CSC for dependable long-term supply for whatever quantity you need. CSC methanol is marketed at a minimum purity of 99.85% and with unusually strict specification limits—one of the highest purities known for a bulk chemical. You can't get better quality—or service—anywhere!

INDUSTRIAL CHEMICALS DEPARTMENT

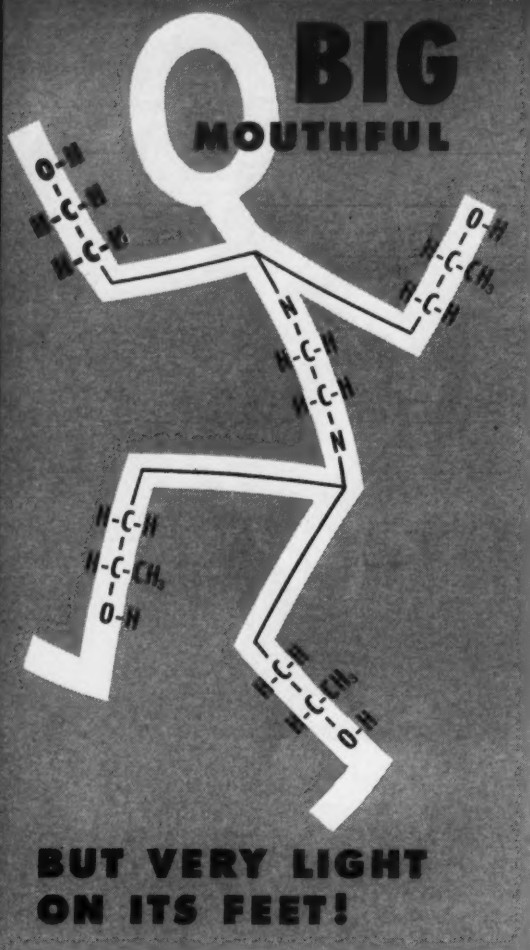
COMMERCIAL SOLVENTS CORPORATION

260 MADISON AVENUE, NEW YORK 16, N. Y.

Atlanta • Boston • Chicago • Cincinnati • Cleveland • Detroit • Kansas City
Los Angeles • New Orleans • Newark • New York • St. Louis • San Francisco
IN CANADA: McArthur Chemical Co. (1958) Ltd., Montréal • IN MEXICO: Comsolmex, S. A., Mexico 7, D. F.



Check 1091 opposite last page.



... another **Nalco oxyalkylation tool** for your research

Monohydroxyethyltrihydroxypropylethylenediamine generally is pronounced "OH! OH!" around the Nalco Labs. In addition to six highly-reactive centers, the primary alcohol of the monohydroxyethyl group has considerably greater reactive properties than the three secondary alcohols of the hydroxypropyl groups—creating, in addition to other characteristics, greater water solubility than is offered by uniform hydroxypropyl groupings.

"OH! OH!" is a clear, viscous liquid. Boils at 192°C. at 0.5 mm., and has good heat stability. Use it as a plasticizer... a surfactant... or with some dibasic acids to make resins... or try your own ideas.

Technical grade samples (or tank cars) are available, along with more details on this challenging Nalco oxyalkylation product. Volume prices for "OH! OH!" establish it as a candidate for your consideration.

National Aluminate Corporation is now
NALCO CHEMICAL COMPANY

6294 West 66th Place Chicago 38, Illinois
Subsidiaries in England, Italy, Mexico, Spain, Venezuela and West Germany

In Canada—Alchem Limited, Burlington, Ontario
Serving Industry through Practical Applied Science

Check 1092 opposite last page.

Nalco
CHEMICALS

Nalco
CHEMICALS

Nalco
CHEMICALS

Nalco
CHEMICALS

Nalco
CHEMICALS

Nalco
CHEMICALS

Nalco
CHEMICALS

Nalco
CHEMICALS

Nalco
CHEMICALS

Nalco
CHEMICALS

Nalco
CHEMICALS

Nalco
CHEMICALS

Nalco
CHEMICALS

Nalco
CHEMICALS

Nalco
CHEMICALS

Nalco
CHEMICALS

Nalco
CHEMICALS

Nalco
CHEMICALS

Nalco
CHEMICALS

Nalco
CHEMICALS

Nalco
CHEMICALS

Nalco
CHEMICALS

Nalco
CHEMICALS

Nalco
CHEMICALS

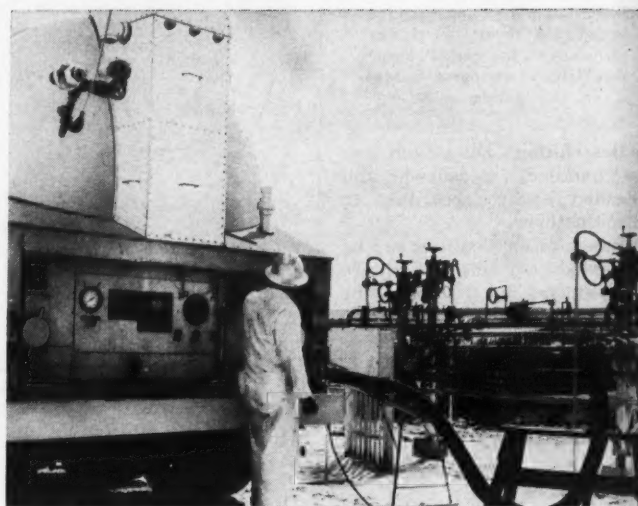
Nalco
CHEMICALS

Nalco
CHEMICALS

CHEMICAL MATERIALS

Despite early warning to the contrary, experience has shown that liquid hydrogen may be handled very safely on a commercial scale. This knowledge coupled with proven tonnage production facilities opens the door to . . .

Chemical raw material uses for ultra-pure liquid hydrogen



Filling an over-the-road liquid hydrogen trailer. Experience gained in handling this material should be valuable in utilizing it as a chemical raw material

Although produced primarily for the government as a potential rocket fuel, ultra-pure liquid hydrogen holds potential as a raw material for a number of products, such as ammonia, methanol, and urea. Extreme purity possible (in terms of gas purities it is estimated at "6 to 8 nines", the number of nines necessary to express percent purity i.e. 99.99999% is "7 nines") could be important as specifications on finished products become tighter.

Recently disclosed facts on U. S. Air Force's tonnage facility in the Florida Everglades, emphasize that this material can be produced with high purity and handled on a large scale . . . with safety (see **CHEMICAL PROCESSING**, August 1959, page 70).

Properties of Liquid Hydrogen

Boiling Pt, °F	-423
Freezing Pt, °F	-434.5
Density	
lb/cu ft	4.43
lb/gal	0.6

Everglades' plant produces liquid hydrogen by combining crude oil, air, and water to generate hydrogen gas and utilizing electrical energy to refrigerate and liquefy it. An important aspect of production, and one that adds to economy of storage and safety in handling, is ortho-para conversion.

Free hydrogen exists in two different forms, ortho and para. Gaseous hydrogen is largely ortho. However, after

liquefaction the molecule undergoes a slow conversion to para with an energy release which is substantial in comparison with heat required to vaporize the liquid.

As a result, liquefied ortho hydrogen would entirely vaporize even if stored in a perfectly insulated container. Therefore, it is necessary to conduct a catalytic transformation from ortho to para form during cooldown of gas prior to liquefaction. Final liquid product is substantially all para hydrogen.

Use in Rockets

Specific impulse (I_{sp}) is a prime yardstick of rocket propellant performance. Units are pounds of thrust per pound per second of propellant, usually expressed in seconds. Since a rocket must carry all its own energy as well as its working fluid along right from takeoff, propellant combination with greatest possible energy content is an important objective. Here are some comparative specific impulses found in tests based on ignition chamber pressures of 300 psi, operating at sea level.

Combination	I_{sp} (seconds)
LOX-kerosene	260
LOX-hydrogen	350
H ₂ -F ₂	365
H ₂ -ozone	375

For impulse levels beyond this, systems other than chemical reactions must be used to generate energy. Nuclear rockets pose the next breakthrough.

(For further information on liquid hydrogen contact Air Products, Inc., PO Box 538, Allentown, Pa.)

Check 1093 opposite last page.

NEXT MONTH

How chromate compounds are used in combination with other chemicals to manufacture effective, low-cost corrosion inhibitors will be covered in feature article.

For Coconut Oil Fatty Acids or Methyl Esters, remember...

At El Dorado SERVICE IS FOREMOST

OA 419 FOREMOST EL DORADO
7/1/59 458 PM GA PLS
THIS IS ST LOUIS XYZ URGENT
NEED TANKCAR METHYL LAURATE 96
NO LATER THAN 6 DAYS FROM DATE
SOONER IF POSSIBLE

The time is 3:05 A.M. and all is well. At 5 A.M., twelve hours after the above wire was received at Foremost El Dorado's Oakland, California plant, this tank car loaded with Eldo Methyl Laurate 96 will be rolling.

Four days and 2400 miles later in St. Louis, an anxious Foremost customer will relax. This same tank car will roll to his siding, the seal on the

dome will be broken and 8000 gallons of Methyl Laurate will be ready for use... a full day ahead of schedule.

This kind of quick service... along with strict attention to the purity and uniformity of product... has made Foremost El Dorado a dependable source of coconut oil products for over 65 years.

Let us serve you with the same dependability



Even faster deliveries from Eastern and Mid-Western shipping points. Contact the agent nearest you or write for samples and specifications. Dept. B-1

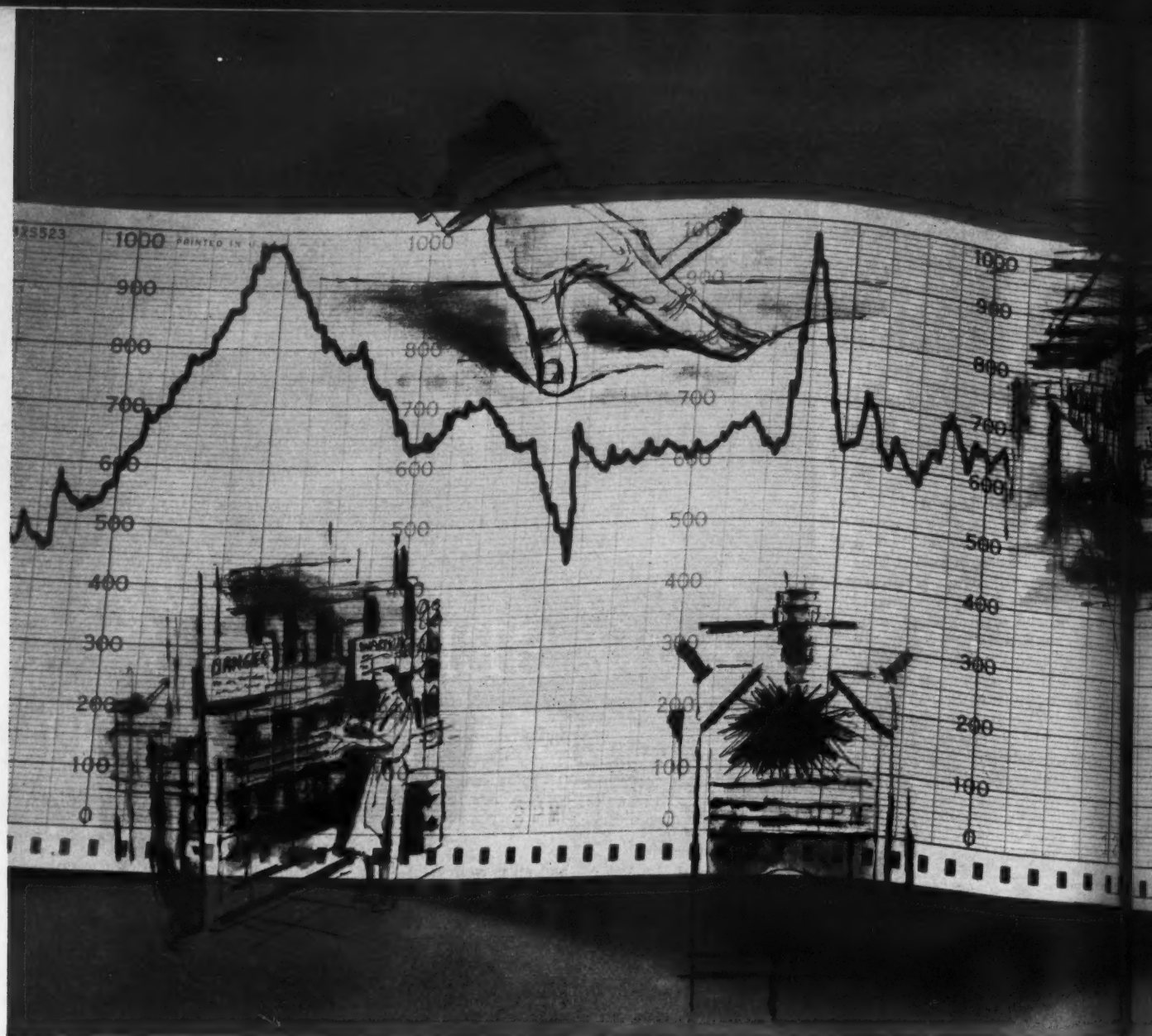
FOREMOST FOOD AND CHEMICAL COMPANY

P. O. Box 599, Oakland 4, California

FATTY ACIDS			METHYL ESTERS		
Caprylic	Capric	Lauric	Caproate	Caprylate	Caprate
	Myristic	Palmitic	Laurate	Myristate	Palmitate
Cocoleic	Eldhyco	Coconut	Oleate	Eldo*18	Coconate
					*T.M. REG.

Atlanta Geo. E. Missbach & Co.	Chicago M. B. Sweet Company	Houston Joe Coulson Company	New Orleans Bretthick & Sheahan Company	Oklahoma City Rullman Brothers
Boston N. S. Wilson & Sons	Cleveland F. W. Kamin Company	Kansas City Vulcan Sales Company	New York H. Reisman Company	St. Louis Harry A. Baumstark & Company
	Detroit Harry Holland & Son, Inc.	Minneapolis M. H. Baker Company	Oakland Foremost Food & Chemical Co.	

Check 1094 opposite last page.



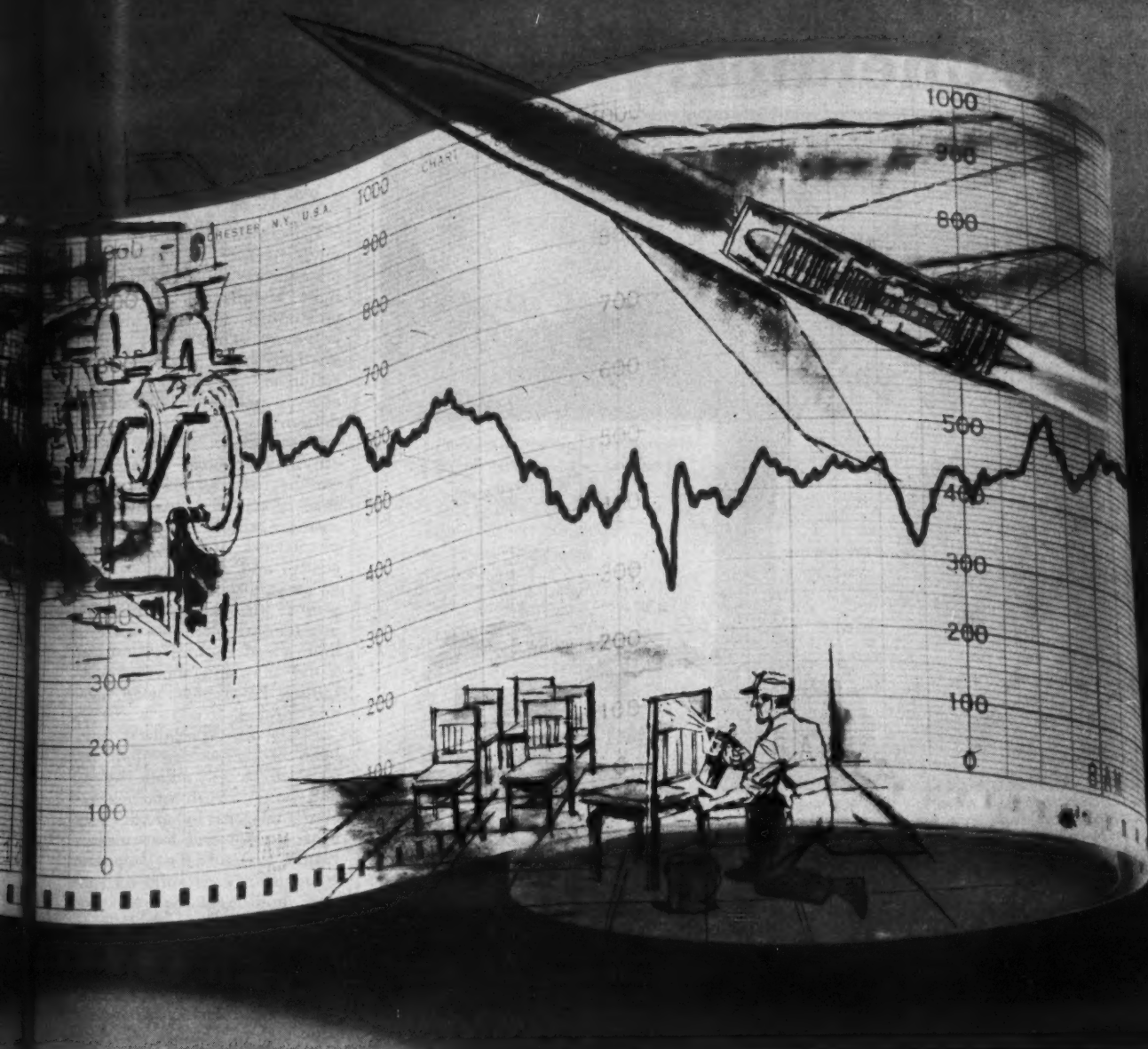
To tame heat and

Does heat or flame present a hazard in your business or product, or set a limit to the efficiency of equipment?

If so, Celanese has some chemical answers for you:

We have developed—and produce—fire-resistant synthetic lubricants and hydraulic fluids, fire resistant plasticizers, fire-retardant additives for paints and varnishes, motor fuel additives that improve combustion, and heat-resistant lubricants for high temperature applications. These products are typical examples of the contribution of Celanese to safety and progress in American industry. Take advantage of our long experience in reducing the hazards and losses of heat, fire and explosion. If you have such a problem, why not ask us to help? Write Celanese Corporation of America, Chemical Division, Dept. 591-J, 180 Madison Ave., New York 16.

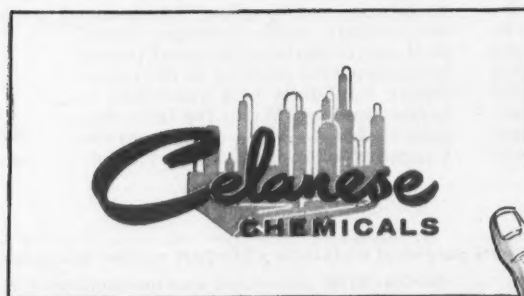
Celanese® Celluflex® Cellulube® Cellutherm™



keep fire friendly

LEFT TO RIGHT

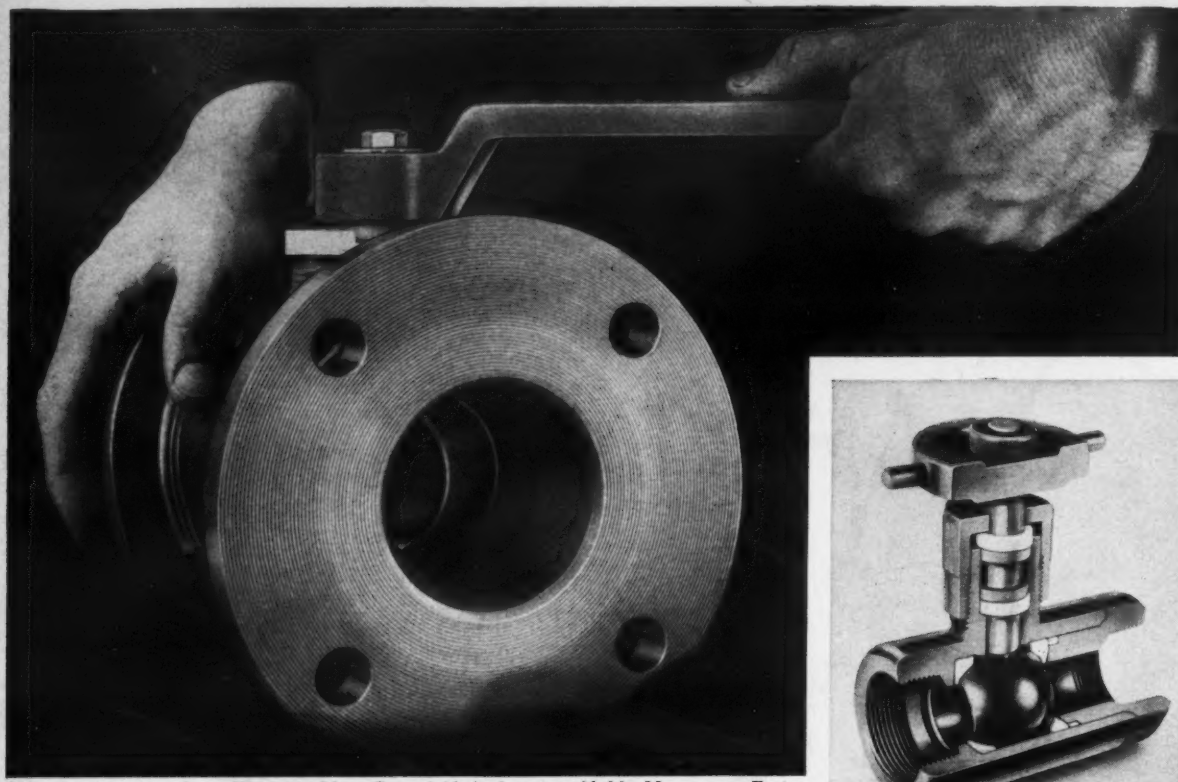
- Cellulubes, fire-resistant hydraulic fluids for safer operation of die casting machines, hydraulic presses and other power transfer units near potential sources of ignition.
- Celluflex plasticizers add fire resistance to urethane foams and other plastics.
- Fuel additives improve performance characteristics of gasolines.
- Cellulubes, combustion-resistant lubricants for air and gas compressors; also reduce maintenance costs.
- Celluflex plasticizers contribute the property of fire retardance to paints and varnishes.
- Cellutherm high temperature lubricants for faster jet engine speeds.



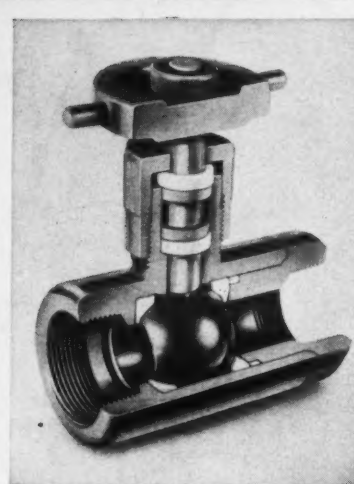
For more information on product at left, specify 1095 see information request blank opposite last page.

Canadian Affiliate: Canadian Chemical Company Limited, Montreal, Toronto, Vancouver
Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Ave., New York 16, N. Y.

B.F. Goodrich Chemical *raw materials*



Valves by Jamesbury Corp., Worcester, Mass. Geon rigid vinyl parts molded by Mannesman-Easton Plastic Products, Inc., Easton, Pa. Valves in sizes from 1/2" to 4", shown in large photograph, are rated at 150 psi to 100 F. and at 50 psi to 130 F. They can be remote operated. B.F. Goodrich Chemical Company supplies the Geon rigid vinyl material only.



New ball valve of Geon helps piping systems fight corrosion

Thousands of test cycles with this new valve made from Geon rigid vinyl have proved the effectiveness of its seal, either at full pressure or vacuum. Since it is made entirely of Geon except for seats and seals, it offers pipe users another weapon for the battle against corrosion. Geon offers superior resistance to oils, acids, alkalis and most chemicals.

In addition, rigid Geon weighs less than metal. Shipping weights are lower, installation is easier. These valves can be obtained with threaded ends, weld ends, or flanges. They are self-compensating for changes in

pressure or temperature. There is no problem of galling or seizure. No lubrication is needed.

Geon offers remarkably varied opportunities for products that open new markets or improve present applications. In rigid form it is being used for pipe, window frames and ductwork . . . in other forms for weatherstrip, wall coverings, foam products, or coatings for metal, paper or textiles. One member of the Geon family can surely help you make a better product. Write for information to Dept. AL-8, B.F. Goodrich Chemical Company, 3135 Euclid

Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.



B.F. Goodrich Chemical Company
a division of The B.F. Goodrich Company



GEON polyvinyl materials • HYCAR rubber and latex
GOOD-RITE chemicals and plasticizers • HARMON colors

Check 1096 opposite last page.

CHEMICAL MATERIALS

Heat, light degradation in vinyls decreased by two epoxies

They react synergistically with metallic stabilizers

Uses: Epoxy plasticizers for vinyl resins.

Features: Effective heat and light stabilizers, as well as plasticizers, for vinyl chloride polymers. They react synergistically with many metallic stabilizers to increase resistance to heat and light degradation.

Description: EP-8 is 2-ethylhexyl epoxy tallate and can be used as low-temperature plasticizer in place of azelate, adipate, and sebacate plasticizers. It gives low viscosity and excellent viscosity stability to vinyl plastisols. It also reduces dilatancy problem in plastisols used in high-speed coating operations. Vinyl film and sheeting containing EP-8 have good hand and drape.

EP-0, an epoxidized soybean oil, offers excellent resistance to extraction by oil and water. Both epoxies are characterized by high oxirane oxygen and low unsaturation, assuring long-term compatibility, stabilizing action, and resistance to color development and rancidity in vinyl formulations.

(Flexol EP-8 and EP-0 are being introduced by Union Carbide Chemicals Company, division of Union Carbide Corporation, 30 E. 42nd St., New York 17, N.Y.)

Check 1097 opposite last page.

Silicone rubber sponge cures within minutes at room temperature

Resists sunlight, weather and temperature extremes

Uses: Two compounds for such applications as void filling, cushioning, and vibration damping.

Features: Both compounds cure in a few minutes at room temperature to form resilient, silicone-rubber sponge. This quality makes them suit-

able for applications which could utilize silicone sponge but haven't, due to longer and higher-temperature curing characteristics of conventional compounds.

Description: Compounds RTV-120 and RTV-160 resist temperature extremes, weather, ozone and sunlight. Similar in most characteristics, RTV-120 has less resiliency than RTV-160.

FORMULATION

(parts by weight)

RTV-120 RTV-160

RTV-20 compound	100	-----
RTV-60 compound	-----	100
blowing agent	25	20
diluent	11.5	11
curing agent	0.96	0.96

Pot life and sponge properties may be varied somewhat to suit individual application. Smaller pore size, accompanied by reduced pot life, can be obtained by increasing Silicure T-773 concentration.

Mix must be prepared rapidly so that pour is completed within 1½ minutes from start of mixing.

(RTV-120 and RTV-160 are developments of Silicone Products Dept., General Electric Co., Waterford, N.Y.)

Check 1098 opposite last page.

Fluoroelastomer cement bonds Viton to Viton

Uses: Vulcanizing fluoroelastomer cement for bonding Viton (Du Pont's fluoroelastomer) to itself, to lightly cured Viton, to metal; and it can be used to coat fabrics to the fluoroelastomer.

Features: Cement can be used at room temperature.

Description: Two-part material consists of solution of Viton containing about 35% solids and 65% solvent, plus a non-volatile room-temperature-vulcanizing catalyst.

Available in four-ounce kit with catalyst.

(C-328 RTV is development of The Connecticut Hard Rubber Company, 407 East St., New Haven 9, Conn.)

Check 1099 opposite last page.

TOWER PACKING

All the facts about HARSHAW *tellerettes*

Contained in this comprehensive booklet discussing the application of Harshaw Tellerettes to tower packing.

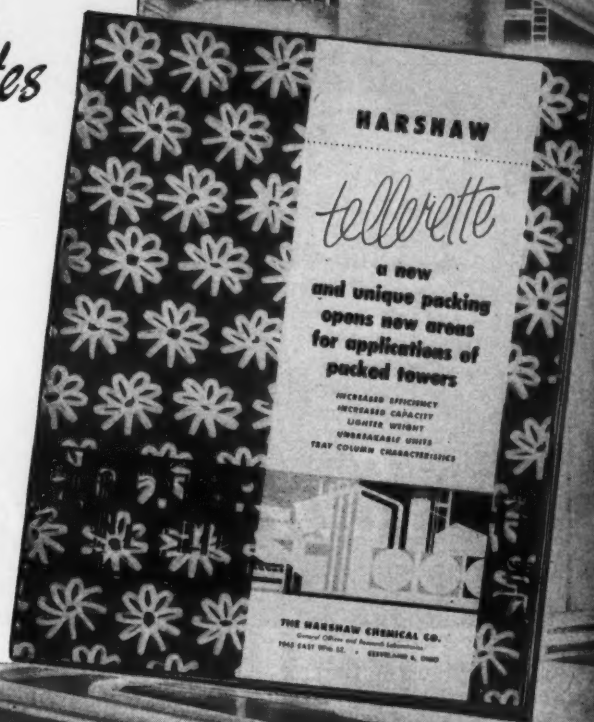
Subjects discussed at length (accompanied by pertinent charts)

1. The Tellerette Shape
2. Physical Characteristics
3. Lower Capital Investment and Operating Cost
4. Low Weight
5. Reduced Tower Height
6. Increased Tower Capacity
7. Support Plates
8. Corrosion Resistance
9. No Clogging

THE HARSHAW CHEMICAL CO.

1945 East 97th Street, Cleveland 6, Ohio

Branches in Principal Cities



Send today for your free copy... Use this convenient coupon!

THE HARSHAW CHEMICAL CO.

1945 EAST 97TH STREET
CLEVELAND 6, OHIO

Please send me _____ copies of your booklet, "Harshaw Tellerette"

Name _____

Company _____

Street Address _____

City _____ Zone _____ State _____

Check 1100 opposite last page.

**Extended 500°F operation
fails to hamper
epoxy resin**

Heat-distortion temperature
of resin is 370°F

Uses: Vacuum impregnating
and laminating operations.

Features: Cured resin can
withstand extended periods
of operation at temperatures
to 500°F. It exhibits heat-dis-
tortion temperature of 370°F.

Description: Low-viscosity
epoxy impregnating resin sys-
tem has pot life of two weeks
at 77°F. Product is supplied
as light amber mobile resin.
Physical properties of cured
resin are as follows:

Specific gravity @ 25°C	1.2
Heat-distortion temp, °C	150
Flexural strength, psi	20,500
Compressive strength, psi	19,000
Dielectric strength, v/mil	480

(Isofil 211 epoxy impregnating compound is product of Isochem Resins Corporation, 221 Oak St., Providence 9, R. I.)

Check 1102 opposite last page.

**Polyanhydride structure
affords resin potential
in chemical synthesis**

Ethylene-maleic anhydrides
made in different series

Uses: In preparation of such
derivatives as transparent film
formers, polymeric liquids,
waxy solids and polyampho-
lytes. Other possible applica-
tions include adhesives, dis-
persants, suspending agents,
controlling crystal formation,
foundry resins, surface coat-
ings, textile sizing, and thick-
eners for aqueous systems.

Features: The polyanhy-
dride structure offers unique
possibilities as building block
for chemical synthesis.

Description: Series of wa-
ter-soluble ethylene-maleic
anhydride copolymers can be
furnished as anhydride, free
acid or amide-ammonium salt.

Each resin in series is
available in low, intermediate,
and high molecular weights

four buy-words for NATIONAL ADIPIC ACID

Our large-volume production of NATIONAL ADIPIC ACID is continuously analyzed to be certain that every shipment conforms to our tough specification on APHA color and to our constant high-purity standard.

Result: Users of NATIONAL ADIPIC ACID are sure of receiving specification-grade material with predictable performance in their light-colored plasticizers, resins, alkyds or other monomeric or polymeric esters.

If you haven't received a working sample and a copy of our current Adipic Acid shipping specification, we'll be glad to furnish them . . . and to quote on your needs. Write or phone our nearest office.

NATIONAL ANILINE DIVISION

40 RECTOR STREET, NEW YORK 6, N. Y.

Atlanta Boston Charlotte Chicago Greensboro Los Angeles
Philadelphia Portland, Ore. Providence San Francisco

In Canada: ALLIED CHEMICAL CANADA, LTD., 100 North Queen St., Toronto 10

Distributors throughout the world. For information:
ALLIED CHEMICAL INTERNATIONAL • 40 Rector St., New York 6, N. Y.



Check 1101 opposite last page.

CHEMICAL MATERIALS

as fine, free-flowing white powder. Cross-linked versions of anhydride and amide-ammonium salt also available.

Physical properties of linear DX-840 resin anhydride follow:

EMA Anhydride

Form	White powder
Bulk density, lb/cu ft	20
pH, 1% aqueous solution	2.35*
Softening point, °C	170
Decomposition point, °C	235

*Dissolves with hydrolysis to free acid after 2-3 hr at 80°C or 10-15 minutes at 95°C.

(DX840 series of ethylene-maleic anhydride copolymers are produced by Plastics Division, Monsanto Chemical Company, Springfield, Mass.)

Check 1103 opposite last page.

Fold polyester laminate without cracking it

Uses: Applications requiring the formation of simple shapes that are tough, flexible, and will hold their form; and which must be cold-formed and/or punched.

Features: Flexibility is such that material can be repeatedly creased or bent into small radii without cracking, breaking, or delaminating.

Description: Sheet consists of two plies of 0.010"-thick polyester film laminated together with special bonding agent.

It is uniform in thickness, translucent, smooth, and free from wrinkles or voids. Sheets have excellent resistance to Freon 22 in sealed systems where no moisture is present.

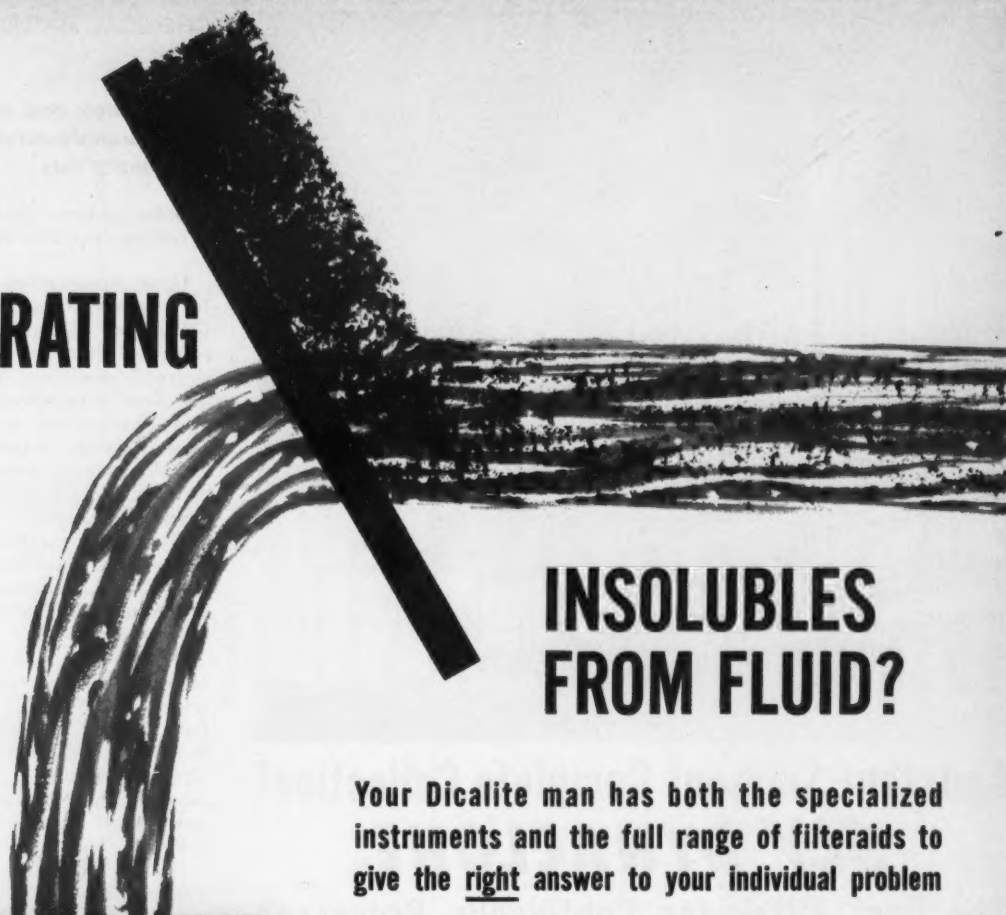
(Lamicoid LPF-1 is product of Mica Insulator Division of Minnesota Mining & Manufacturing Company, Schenectady, N.Y.)

Check 1104 opposite last page.

Masterbatch synthetic rubbers are described in 16-page data and specification book which offers a four-point program for saving on production costs. "Ameripol Micro-Black" — Goodrich-Gulf Chemicals, Inc., 3121 Euclid Ave., Cleveland 15, Ohio.

Check 1105 opposite last page.

SEPARATING



INSOLUBLES FROM FLUID?

Your Dicalite man has both the specialized instruments and the full range of filteraids to give the right answer to your individual problem

For 29 years, Dicalite men have been finding the right answers in thousands of filtration problems, probably no two of them just alike. So, whatever you're filtering, from molten sulfur to drinking water, your Dicalite Service Engineer can come up with the best solution for your particular conditions.

To begin with, he has a complete family of quality-controlled filteraids to work with . . . a range that lets him fit a filteraid to the problem, instead of the other way around.

Then, to test and prove his answers he has special Dicalite-developed instruments such as the 'Bomb' Filter and the Dicalite Test Leaf. This latter is the first laboratory-scale instrument which can accurately predict rotary vacuum precoat filter performance. And, of course, the Dicalite laboratories are available to him — and to you.

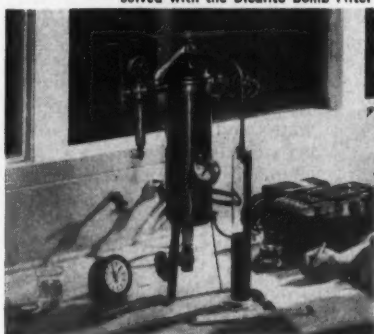
If you have any questions on filtration, we'd be delighted to help . . . just write:

Dependable
GLC
GREAT LAKES
Dicalite
FILTERAIDS

DICALITE DEPARTMENT, GREAT LAKES CARBON CORPORATION
612 SOUTH FLOWER STREET, LOS ANGELES 17, CALIFORNIA

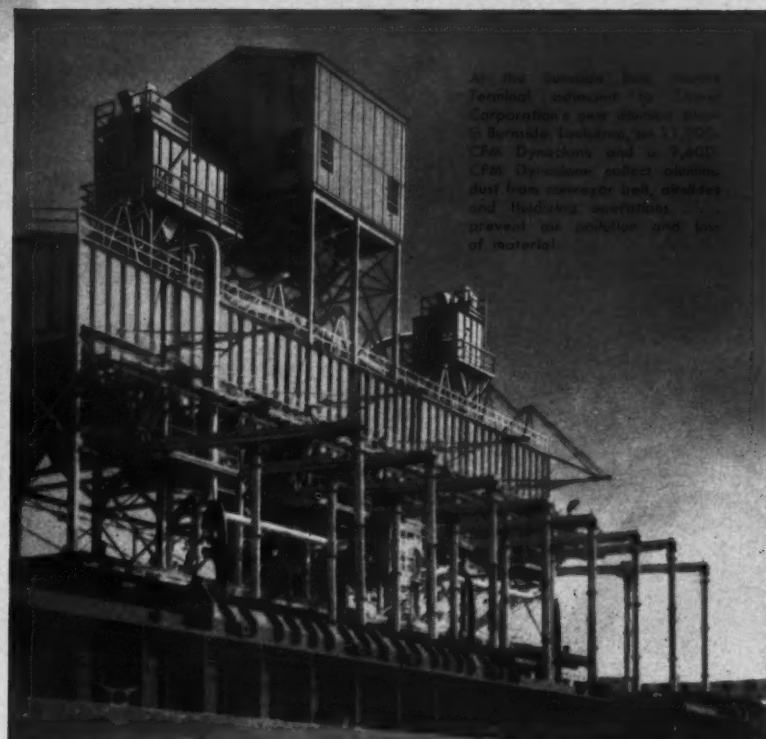


Determining depth of shave-off with the Dicalite Rotary Vacuum Precoat Test Leaf



A problem in pressure filtration being solved with the Dicalite Bomb Filter

Check 1106 opposite last page.



All the SLY Dynaclone dust filter units are built to order. The Dynaclone is a new design dust filter built to order. The Dynaclone is a new design dust filter built to order. The Dynaclone is a new design dust filter built to order.

Constant Suction! Complete Collection!

SLY DYNACLONE®

The Dust Filter for Continuous Processes

Just turn this dust filter on and forget it. The Dynaclone operates continuously, 24 hours a day. It maintains constant, uniform suction at dust sources, reclaims all the dust to prevent air pollution and damage to plant equipment.

The Dynaclone has new "Resist-O-Wear" filter bags (patent pending) that give as much as three times longer bag life . . .

It has a new roller cleaner for simplified automatic self-cleaning. Resilient rubber rolls form a positive dust seal as each row of bags is cleaned by atmospheric air drawn in by the main operating fan.

And it contains more cloth per cubic foot of filter than any other make . . . greater filtering capacity with smaller space requirements.

Learn the many reasons why the Dynaclone represents a new high in dust filter efficiency . . .

Send for 36-Page Catalog 104

SEE THE DYNACLONE in Space 73, the Chemical Show, New York Coliseum, Nov. 30-Dec. 4



THE W. W. SLY MANUFACTURING CO.

4734 TRAIN AVENUE • CLEVELAND 1, OHIO
OFFICES IN PRINCIPAL CITIES

OVERSEAS LICENSEE: ANDREW AIR CONDITIONING LTD., LONDON S.W. 1, ENGLAND

Check 1107 opposite last page.

CHEMICAL MATERIALS

Iso-decanoic acid now being manufactured in quantity lots

Salts, esters, and amides among reactants formed

Uses: Applications in driers for varnishes and enamels, plasticizers and stabilizers for polyvinyl chloride resins, alkydresin modifiers for nitro-cellulose automotive lacquers and alkyd-amine resin appliance finishes, boiler-feedwater defoamers, synthetic lubricants for jet aircraft, fungicides, detergents, emulsifiers, corrosion inhibitors, flotation agents, oil additives, and agricultural chemicals.

Features: Available in commercial quantities.

Description: Iso-decanoic acid is complex mixture of methyl-substituted, ten-carbon, aliphatic, monocarboxylic acids having relatively little alpha substitution. Principal isomers are trimethylheptanoic and dimethyloctanoic acids.

It has a high boiling point and is soluble in organic solvents, but not in water. It will react to form salts, esters, amides, amines, etc.

(Iso-decanoic acid is product of Union Carbide Chemicals Company, division of Union Carbide Corporation, 30 E. 42nd St., New York 17, N.Y.)

Check 1108 opposite last page.

Dust-free granular form of flocculant simplifies feeding, dissolving

High-mol-weight polymers effective in thickening

Uses: Clarification in uranium mining, other solid-liquid separations, and treatment of water and suspensions of sewage, industrial wastes, and chemical precipitates.

Features: In field tests, equal or less amounts of flocculant have produced same results as larger quantities of previously used products.

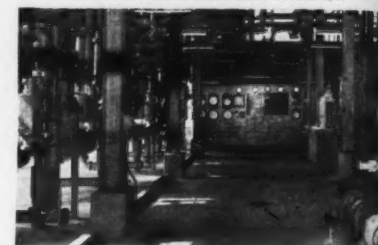
Description: In settling acid-leached uranium ore at counter-current decantation plant, .06-.07 lb of flocculant

NOW ON ORDER

ILLCO-WAY

ionXchange
EQUIPMENT

CORN SYRUP DE-IONIZER USED SINCE 1948



IWT has long been known for successfully applying ionXchange to processes other than water treatment, including such familiar ones as recovery of chromic acid, purification of glycerine to a very high degree, removal of iron from hydrochloric acid, and purification of such organic chemicals as formaldehyde, methanol, and ethylene glycol.

TYPICAL IONXCHANGERS FROM CURRENT ORDERS INCLUDE THE FOLLOWING

MILK A condensed milk plant in Iowa will use ionXchange to reduce calcium content and produce a "soft-curd" milk.

WINE An upstate New York wine producer has ordered ionXchange equipment of polished stainless steel for stabilization ("cold-proofing") of wine.

GLYCERINE The first full-scale commercial ION EXCLUSION system for de-salting glycerine will be installed in a western chemical plant. A mid-western glycerine producer will install ionXchange equipment to recover USP glycerine from a waste stream, without distillation.

GRAPE JUICE An eastern food processor has ordered equipment to remove excess potassium from grape juice.

LACTIC ACID A chemical plant will apply a new system, developed in our Research Department for this specific installation, to purify lactic acid.

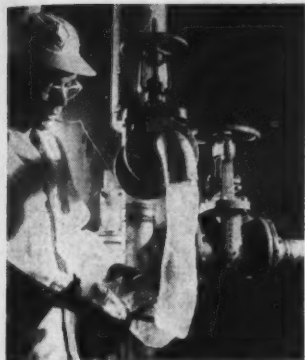
CITRIC ACID An eastern producer will remove heavy metals and alkaline earth metals from citric acid by cation exchange.

OTHERS ARE "IN PROCESS"
We are also building pilot plant equipment and fulfilling research contracts covering a number of other previously untried ionXchange processes, for visitors who have come to us from all over the free world to discuss possibilities of using ionXchange.

ILLINOIS WATER TREATMENT CO.
840 CEDAR ST., ROCKFORD, ILLINOIS
NEW YORK OFFICE: 141 E. 41th St., New York 17, N.Y.
CANADIAN DIST.: Pumps & Softeners, Ltd., London, Ont.

Check 1109 opposite last page.

CHEMICAL PROCESSING



Aqueous solution stream of flocculating agent is shown leaving polymerization kettle. High molecular weight increases performance as filtration and settling aid

provided same settling rate, overflow clarity and underflow fluidity and density as .11 lb/ton of previously used product.

During tests at Colorado plateau uranium operations, flocculant decreased soluble uranium losses by increasing underflow densities 5 to 7% with equal or smaller dosages.

With molecular weight on the order of several million, polymer's essentially dust-free granular form simplifies feeding, wetting, and dissolving.

(Superfloc 16 flocculant is development of American Cyanamid Company, 30 Rockefeller Plaza, New York 20, N. Y.)

Check 1110 opposite last page.

Resin strength retained after 600°F exposure

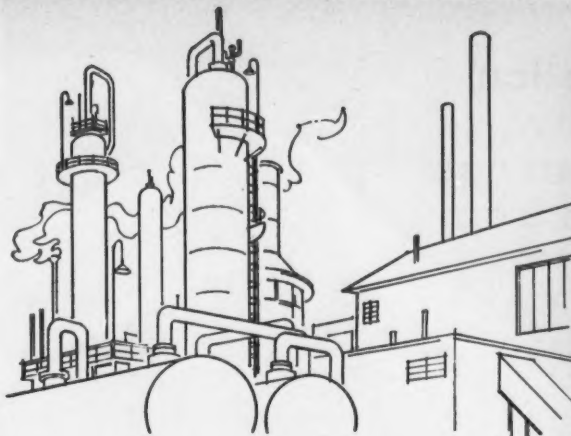
Uses: With fibrous glass and asbestos reinforcements to make radomes for supersonic aircraft. It has expected application in areas where high temperatures have previously prohibited use of plastics.

Features: Resin retains strength after prolonged exposure to temperatures of 600°F.

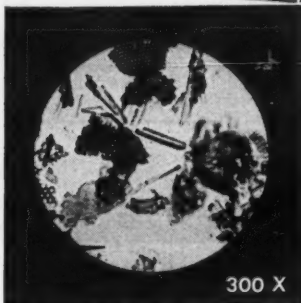
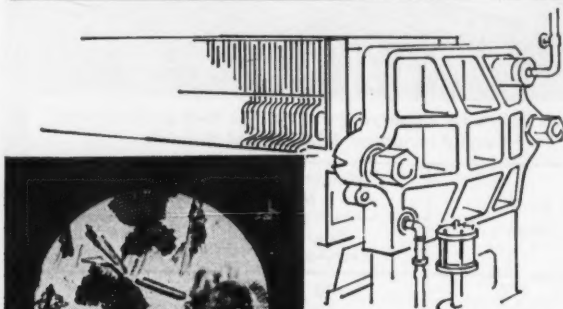
Description: Product is silane-modified phenol-formaldehyde resin.

(Resinox SC-1013 is product of Plastics Division, Monsanto Chemical Company, Springfield, Mass.)

Check 1111 opposite last page.



For flow rate plus clarity—Hyflo Super-Cel has the right combination of large and fine particles. Heavily used in chemical processes such as caustic soda production.



300 X

For fast flow rates—Celite 545 has a higher proportion of coarse particles. Frequently used for clarification of resins and other viscous liquids.



300 X



For maximum clarity—Filter-Cel has a relatively fine particle size distribution. Used in producing lard, salad oil, other hydrogenated oil products.



300 X

In diatomites, Johns-Manville precision processing works for you

Celite has the exact grade for every filtration need from fast flow rate to maximum clarity

Study samples of various filtration grades of Celite® diatomite with the unaided eye. Rub them between your fingers. One grade looks, feels very much like another.

Then compare these grades under the microscope. Each has its own distinctive particle size distribution. Each is precision-milled to fill the most exacting filtration requirements, ranging all the way from maximum flow rate to maximum clarity.

Celite 545, for example, with a higher proportion of large to fine particles, is used to remove large suspended impurities at maximum flow rates. Hyflo Super-Cel® has a balanced particle size distribution, combines good liquid clarity and moderate flow rate. But Filter-Cel® has a much higher ratio of small particles, is tailored for use where high clarity outweighs flow rate.

Whatever your filtration problem—Johns-Manville can furnish the "right"

grade for the job. You have a choice of 9 intermediate grades *plus* many special grades. Each comes from the largest and purest commercially available deposit. Each is processed and graded at the same plant under the same uniform conditions.

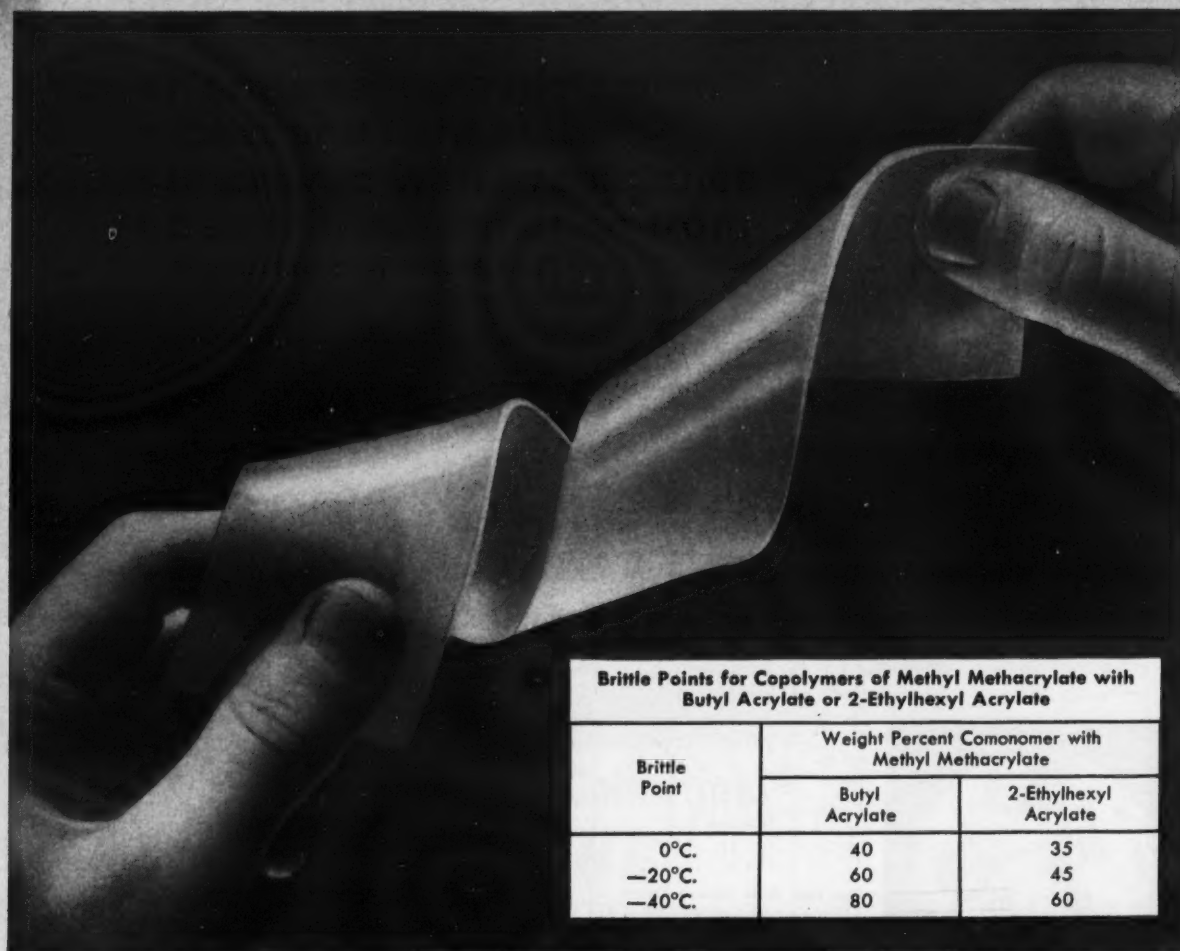
For information on specific filtration or mineral filler problems, talk to your nearby Celite engineer, or write to us. Johns-Manville, Box 14, N. Y. 16, N. Y. In Canada, Port Credit, Ont.

*Celite is Johns-Manville's registered trademark for its diatomaceous silica products

JOHNS-MANVILLE



Check 1112 opposite last page.



Brittle Points for Copolymers of Methyl Methacrylate with Butyl Acrylate or 2-Ethylhexyl Acrylate

Brittle Point	Weight Percent Comonomer with Methyl Methacrylate	
	Butyl Acrylate	2-Ethylhexyl Acrylate
0°C.	40	35
-20°C.	60	45
-40°C.	80	60

copolymerize with BUTYL ACRYLATE or 2-ETHYLHEXYL ACRYLATE

Would you like to give your polymer enduring flexibility and at the same time improve its heat and light stability and water resistance? Copolymerize your monomer—be it styrene, vinyl chloride, methyl methacrylate, or one of many others—with butyl acrylate or 2-ethylhexyl acrylate. The table above shows how either butyl acrylate or 2-ethylhexyl acrylate can lower the brittle point of a copolymer and build lasting plasticization right into the polymer chain. The acrylic plasticizing agent doesn't volatilize or migrate, nor can it be extracted by solvents. In addition, the added acrylic links in your copolymer confer better resistance to water and to deterioration by heat and light. Furthermore, these copolymers can be processed at lower temperatures, and they form

films more readily at low temperatures because of improved flow properties.

Copolymers made with butyl acrylate or 2-ethylhexyl acrylate are useful in producing emulsion and solution coatings, textile finishes, packaging films, paper coatings, leather finishes, adhesives, and elastomers. Write to Dept. SP-28 for literature on butyl acrylate, 2-ethylhexyl acrylate and other acrylic monomers.



Chemicals for Industry

**ROHM & HAAS
COMPANY**

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Check 1113 opposite last page.

CHEMICAL MATERIALS

High performance wedded to fabrication ease in laminate

Uses: Printed-circuitry applications in computers.

Features: Laminated plastic has flexural strength and insulation and moisture resistance approaching that of glass epoxy laminates. At same time, it retains ease of machining and punching characteristic of paper phenolic laminates.

Description: Paper base-epoxy resin laminated plastic is furnished in standard and copper-clad forms. It is self-extinguishing. Tentative mechanical and electrical properties of 1/16" thick sheets of standard form are as follows:

Water absorption, %	0.40
Flexural strength:	
Lengthwise, psi	27,500
Crosswise, psi	19,500

(Grade XY-1 epoxy laminates are products of Taylor Fibre Co., Norristown, Pa.)

Check 1114 opposite last page.

Reflectivity level of -40db guaranteed for absorber

Uses: Microwave absorber.

Features: Guaranteed at minus 40 db reflectivity level for appropriate frequency band.

Description: Available in 6" (CV-6) and 9" (CV-9) thicknesses, CV-6 has frequency range of 5.5 through 50 kmc, while CV-9 ranges from 2.5 through 50 kmc.

Both thicknesses are supplied as lightweight, flexible, fire-retardant foam product manufactured from polyurethane resins.

(Eccosorb CV-6 and CV-9 are manufactured by Emerson & Cuming, Inc., Canton, Mass.)

Check 1115 opposite last page.

Liquid colloidal sodium and potassium silicates' bonding properties are described in three-page bulletin. Various applications are presented. Bul T-17-42—Philadelphia Quartz Company, 1158 Public Ledger Bldg., Philadelphia 6, Pa.

Check 1116 opposite last page.

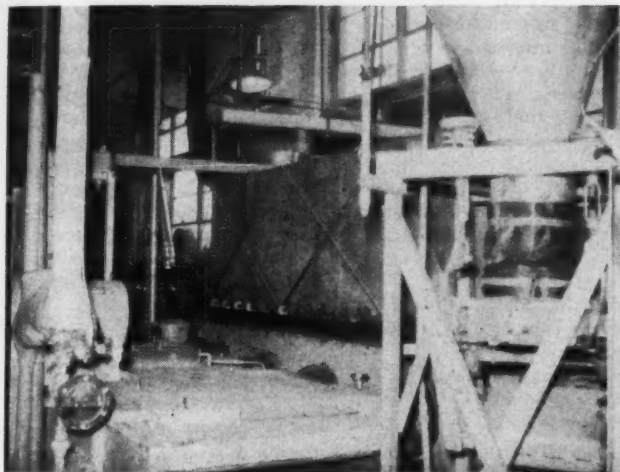


IDEAS: from other industries and nuclear field
— new trends in research, processes, services

Producing a uniform, top-quality product
quickly and efficiently, vibratory feeder-dryer
combination at Bristol Laboratories continuously . . .

Dries Aspirin in Two Minutes

TED F. MEINHOLD, Associate Editor
with **J. S. CASH**, Senior Project Engineer
Bristol Laboratories Inc.



Feed end of vibratory dryer. Feeder (right) delivers 3-5% moisture aspirin crystals to 12½' long dryer (right rear)



Discharge end of dryer. Dried product drops into inlet of pneumatic conveyor (arrow) for transferring to storage and packaging areas. Table-type unit to right of dryer furnishes hot air supply

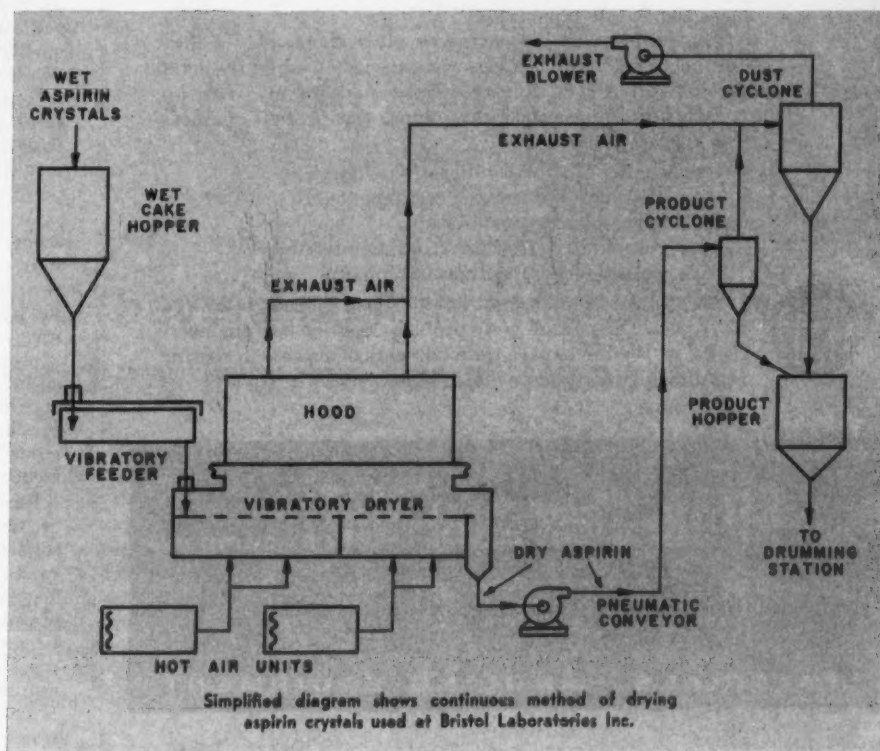
Problem: A fast, reliable, and efficient continuous method of drying aspirin crystals was sought by Bristol Laboratories' engineers for their new Syracuse, New York, plant. Numerous types of conventional equipment were considered, but rejected for various reasons — including high initial cost, excessive space requirements, large product holdup, heavy maintenance requirements, and risk of off-quality product.

Rigid temperature, mechanical, and sanitary control were required to prevent damage or contamination to the delicate crystals. Crystal size ranges from -20 to +100 mesh.

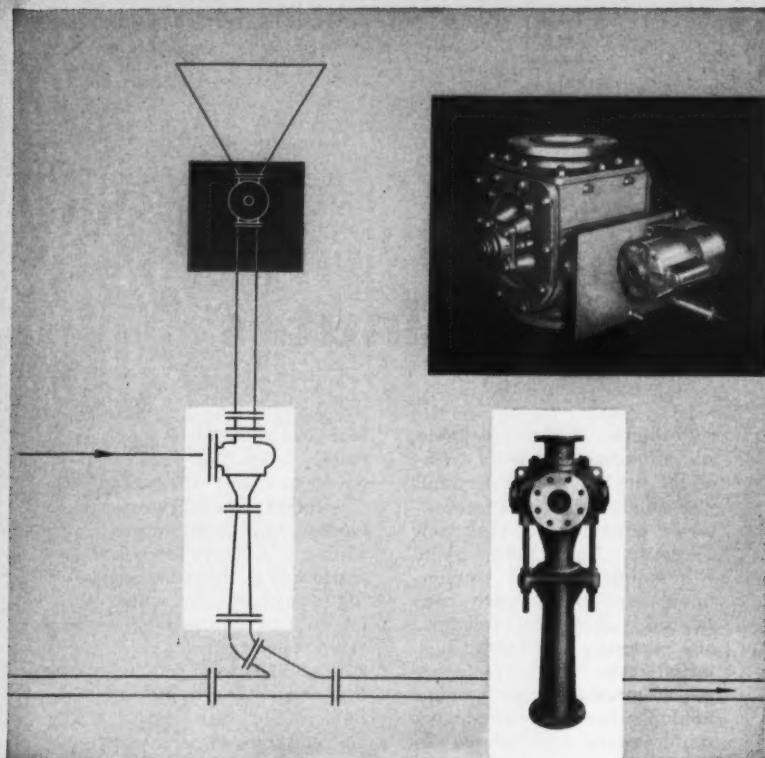
Moisture content is approximately 3-5%. This must be reduced to about 0.01%.

Solution: A vibratory-type feeder and dryer were installed. The units form part of a train of continuous processing equipment in which the crystals are successively separated from a solvent slurry, surged in a wet-cake hopper, dropped by gravity to the feeder, fed into dryer, discharged into a pneumatic conveyor, and accumulated in an overhead, dry-product hopper for later drumming. Entire system consists of closed equipment to prevent contamination.

The vibrating feeder is 1 x



Simplified diagram shows continuous method of drying aspirin crystals used at Bristol Laboratories Inc.



MIXING IN TRANSIT

Here is a practical solution to a chemical materials handling and mixing problem—worked out with A-S-H equipment for the process industries.

The problem was to transport two chemicals—a dry, granular solid and a liquid—to a tank. By feeding the solid through an A-S-H Rotary Feeder and mixing with an A-S-H Low Pressure Hydrovactor, the process engineer was able to *mix in transit*.

The benefits of this installation include:

- elimination of mixing equipment
- easy, low cost installation
- comparative freedom from maintenance
- positive feed and thorough mixing



Like to know more? Write for Data Sheets DVC and Ed today. Or give us your problem and let our engineers tackle it. We have more than 36 years of success in solving the difficult materials handling problems.

the **Allen-Sherman-Hoff** company
257 E. Lancaster Ave., Wynnewood, Pa.
Offices and representatives in principal cities
MATERIALS HANDLING EQUIPMENT

Check 1117 opposite last page.

IDEAS

6 x ¾' deep with a 2½ x 6' high framework. Type-304 stainless steel is used for all parts in contact with material being processed. Polished, sanitary construction is used throughout. Feeder is furnished with clamp-on, stainless steel cover.

Primary function of vibrating feeder is to spread wet crystals uniformly across entire dryer width so that efficient heat transfer will occur. Feeder is driven mechanically by an eccentric rotating weight. Capacity is easily varied by changing speed of the rotating weight.

Dryer is 3 x 12½ x 3' high, covered by 3'-high hood independently suspended overhead. Hood is attached to dryer by a flexible air-tight skirt. Dryer consists of a deep trough into top of which slitted screen segments are assembled through which air is blown.

Wet product enters at one end of dryer through a sleeve. Crystals vibrate across screen while being suspended in current of hot air blown through screen from below. Dry product is discharged at opposite end and drops into inlet of pneumatic conveyor.

Flow rate through dryer is varied between 4-6 fpm. Bed thickness is function of relative rates of dryer and feeder. Drying capacity is function of cake feed rate and thickness, as well as of velocity and temperature of hot air supply.

Dryer's air chamber, located below screens, is divided into four sections which are fed by two independent steam-heated hot air supply units. This permits temperature and air flow zoning of dryer bed, if desired. All metal parts of dryer coming into contact with product or fresh hot air, are made of type-304 stainless steel.

Results: The vibratory dryer, teamed-up with the vibratory feeder, have resulted in rapid and efficient drying of aspirin crystals at minimum expense. Drying efficiency has been so high — even with a residence time of only two minutes — that dryer capacity is believed to be three to four times its nominal design rat-

ing. Calculations show that each inch of bed depth at two minute holdup is equal to 1½ cfm of product.

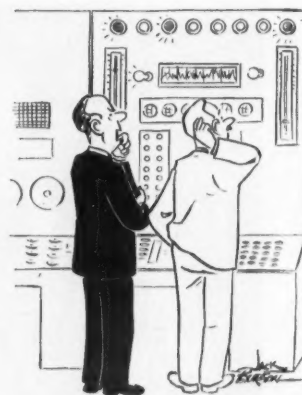
In operation, wet crystals enter at 40°F. Dried product leaves at 150°F, contains maximum moisture content of 0.01%. Drying air is drawn from operating area at room temperature, passed through filters, and heated to 170°F at product end of dryer. Air at 180°F is at feed end.

Exhaust air from dryer is same temperature as product — 150°F. Air velocity in hood is less than 100 fpm, minimizing entrainment losses of fines. Any fines retained in the air are recovered by a cyclone separator.

Dryer produces uniform, high-quality product with no evidence of burning, lumping, or crystal breakage. Unit is easy to start or shut down. Machine is simple to clean and has required only minimum maintenance. It might also be mentioned that there has been no evidence of electrostatic charges being built up in product being processed.

(Carrier Natural Frequency vibrating feeder and dryer-conveyor were manufactured by Carrier Conveyor Corporation, 211 North Jackson, Louisville 2, Kentucky.)

Check 1118 opposite last page.



"I think it's trying to tell us it wants to take up a collection."

CHEMICAL PROCESSING

THAT'S INTERESTING

Plaster made tough

A new aid to industry for producing molds for plastic forming is claimed for a process which turns originally fragile plaster into a strong, tough, ceramic-like material said to be chip and break-resistant.

Process consists of two solutions. One is added to the water used in mixing original plaster of paris for casting. The casting, when dry, is soaked in the other solution.

Manufacturer claims treated objects can be drilled, sawed or machined.

Food for thought

Here's why your waistline may be expanding. Department of Agriculture says the average American this year will down about 1600 lb of food. Here's what you can expect to do: Eat 158.1 lb of red meat, 353 eggs, 29.8 lb of chicken, 348 lb of milk and cream, 17½ lb of butter and margarine, nearly 100 lb of fresh fruits, over 100 lb of vegetables, 16½ lb of coffee.



Only BAGPAKS® have a built-in insurance policy backed by International Paper

ACCIDENTS like this *will* happen. That's why International Paper plans for extraordinary stresses and strains when designing its Bagpak multiwall bags.

Only genuine *Gator Hide*® kraft, famous for toughness, is ever used in making Bagpak multiwalls. Quality is controlled every step of the way. International Paper can do this because it grows its own trees, makes its own paper, converts it into printed multiwall bags to your order. It also designs and builds *Bagpaker*® machines that

can package up to 60 tons of material per hour!

When you buy Bagpak multiwall bags you get speedy shipments geared to your production schedules. *Twenty-one* sales offices and four strategically-located plants save you money by keeping your inventory at a minimum.

Only Bagpak multiwalls are backed by the full resources of International Paper—world's foremost pulp, paper and paperboard producer.

Next time your Bagpak field service engineer drops by, ask him what's new. He knows.



Bagpak Division **INTERNATIONAL PAPER** New York 17, N.Y.

Check 1119 opposite last page.

Spotlighting **2 NEW VOGT VALVES**



★
**FORGED STEEL
INSIDE SCREW
Bolted Bonnet**



GATE and GLOBE VALVES

**150-800 Pounds Service
2000 Pounds Cold, W.O.G.**

Available from stock in
1/4" thru 2" sizes and in both
socket weld and screw ends.

CHECK THESE FEATURES

- 1** Forged steel pressure containing parts designed for light weight and brute strength.
- 2** Hard faced seats and hardened discs and wedges.
- 3** Spiral wound stainless steel or Monel gaskets to suit trim.
- 4** Extra deep stuffing box for long packing life.
- 5** Dished sure-grip handwheel.

Vogt



FORGED STEEL

VALVES

Write for literature Dept. 24A-FCP
HENRY VOGT MACHINE CO., LOUISVILLE, KY.
SALES OFFICES
New York, Chicago, Cleveland, Dallas, Camden, N.J.
St. Louis, Charleston, W.Va., Cincinnati

Check 1120 opposite last page.

IDEAS

Salt-water cooling pipe switched to UPVC to halt corrosion

Stands rugged service on
"Texas Tower" radar station

Change from alloy to UPVC pipe system has successfully derailed corrosion attack in salt-water cooling system for diesel generators, providing power to "Texas Tower" off-shore radar station.

Galvanic corrosion effects were initiated by proximity of copper-nickel-alloy pipe and



UPVC pipe of this type was utilized in emergency replacement which halted galvanic corrosion of alloy pipe in coolant system for diesel generators of "Texas Tower" off-shore radar station

stainless-steel coolant jacket, in combination with salt-water coolant.

UPVC pipe and fittings, in addition to being unaffected by corrosion, have readily withstood vibration created by generators and stresses imposed by stormy seas. Also, they have successfully handled coolant temperatures of 40 to 75°F and operating pressure of 85 psi.

(UPVC fittings and flanges are products of Tube Turns Plastics, Inc., Joint Subsidiary of Chemetron Corporation and Jackson & Church Company, 224 E. Broadway, Louisville 1, Kentucky.)

Check 1121 opposite last page.

Buyer's guide to equipment and services for handling and processing liquids and gases is available. The 16-page booklet summarizes applications ranging from reactions to storage, water treatment to waste treatment, and from design and development to project engineering. Bul 980 — Pfaudler Division of Pfaudler Permutit, Inc., 1094 West Avenue, Rochester, New York.

Check 1122 opposite last page.

THAT'S INTERESTING

Plastics for building

Construction industry in 1958 used an estimated 709 million lb of plastics, Monsanto Chemical Company's Plastics Division reports. The figure represents about 21 percent of the plastics industry's total '58 production.

British boom in chemicals

Since the end of World War II, the British chemical industry has grown faster than any other manufacturing activity in that country, reports Smith, Barney & Co.

'Heat shield' for spaceman

To insure that America's first man to be orbited around the earth will not be literally burned up, he will be protected by a 6-ft-diameter heat shield made by the Brush Beryllium Company, Cleveland.

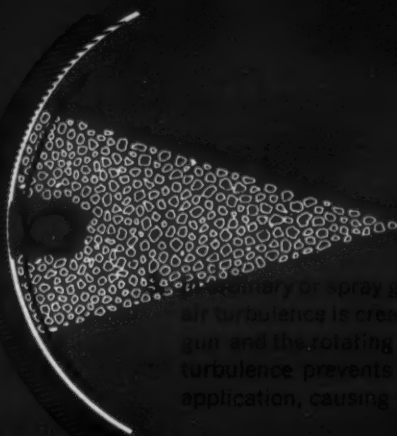
The shield will be positioned behind the "cockpit" to absorb heat as rocket capsule enters earth's atmosphere after orbiting freely above 100 miles altitude.



The lined drums you buy



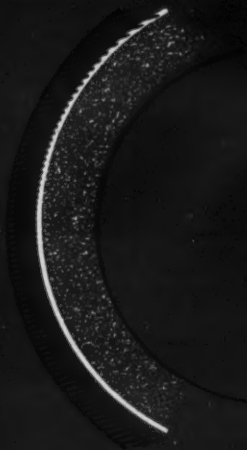
2. may have thin spots.



3. Primary or spray gun application. Air turbulence is created by the spray gun and the rotating drum. Air turbulence prevents uniform lining application, causing thin spots.



4. Failures in thin spots allow your product to contact the drum steel, causing contamination, corrosion, customer complaints and costly losses.



5. Rheem Centrifugal Spray applies lining while drum is stationary. Lining thickness is controlled to $1/10$ mil. The result:

NO THIN SPOTS

in drums lined by

RHEEM

CENTRIFUGAL SPRAY

And that's not all. For more than three years, Rheem Centrifugal Spray has been delivering lined drums free of pinholes, blisters, globs or skips. Air turbulence is eliminated. Human error is eliminated. Linings are cured by unique Rheem Vertical Curing in three stage, high temperature ovens. For more information, or help in developing a lining for a problem product, write the world's largest manufacturer of steel shipping containers at 1701 West Edgar Road, Linden, New Jersey. Plants across the country . . . Chicago, Houston, Linden, New Orleans, Richmond, Calif.; South Gate, Calif.; Tacoma. For other sales offices see the Yellow Pages.



Check 1123 opposite last page.

So SIMPLE that
"Specials" are
Likely to be
Standard!



A sleeve, raised and lowered within a non-magnetic tube, attracts or releases an Alnico magnet attached to a mercury switch. Basically, this is Magnetrol

MAGNETROL

The World's Most Dependable
LIQUID LEVEL CONTROL

Because of the utter simplicity of Magnetrol's magnetic operating principle, standard models can be easily adapted to meet any special requirements for pressure, temperature or corrosive liquids . . . and usually at little extra cost. This Magnetrol versatility has solved all kinds of tough level control problems . . . and given our engineers wide application experience that can be invaluable to you.

Magnetrol is so simple that failure is all but impossible! Using only permanent, unfailing magnetic force for its operation, there's nothing to wear out . . . no diaphragms or bellows to stiffen and rupture . . . no electrodes to short or corrode . . . no packing to bind or leak. Magnetrol is practically maintenance-free! Magnetrol units are available for controlling level changes from .0025-in. to 150-ft. . . with multi-stage switching when desired. Send coupon for full details.

MAGNETROL, Inc.

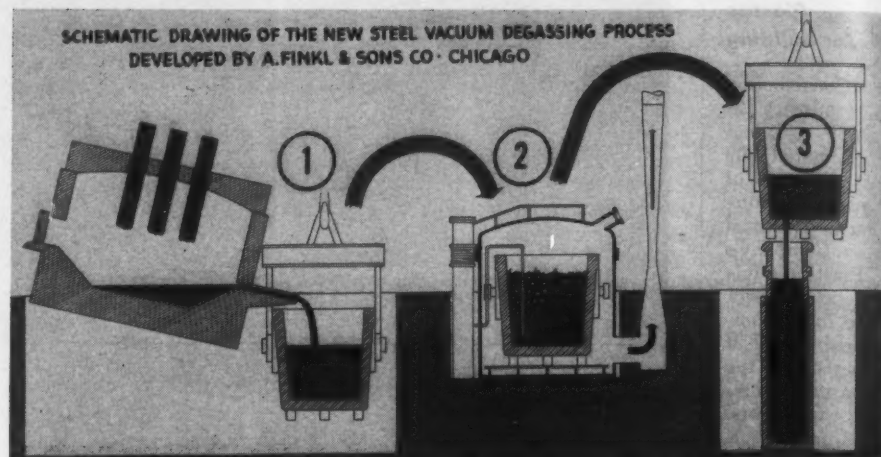
Send Coupon
For Full Details

MAGNETROL, Inc., 2129 S. Marshall Blvd., Chicago 23, Illinois
Please send me catalog data and full information on
Magnetrol Liquid Level Controls.

Name _____
Company _____
Address _____
City _____ Zone _____ State _____

Check 1124 opposite last page.

IDEAS



1) **TAPPING**—Electric furnace discharges 75,000 lb of 3000°F melted nickel-alloy steel into ladle. 2) **DEGASSING**—Ladle is placed inside degassing chamber where high vacuum and helium-gas scavenger remove hydrogen, oxygen, and nitrogen gases. 3) **POURING OR TEEMING**—Ladle is lifted above ingot mold, into which steel pours smoothly without sparking or smoking

Removes 60% of hydrogen from steel in ladle

Vacuum degassing lengthens life of steel
for tough metal-working jobs

Better than 60% hydrogen-gas removal is being achieved on a production basis by vacuum degassing of steel in the ladle at A. Finkl & Sons Co., of Chicago. A 12-minute degassing cycle under 500 microns Hg drops H₂ content from an average of 3.9 down to 1.5 ppm. Much of the oxygen and nitrogen gases are removed at the same time.

The company developed the process to improve the quality of its high-alloy steels for die-block and hot work die-steel applications. Trapped hydrogen can cause small cracks to later develop in steel, reducing service life in severe metal-working jobs.

Vacuum is applied to degassing chamber by four-stage steam-jet ejector using 100-psi steam. Gas bubbles rise to molten-steel surface during the turbulent boiling action which ensues, and are drawn from chamber. Helium gas, introduced at bottom of ladle, helps scavenge the gases and carry them to the surface.

After vacuum is broken, chamber is opened and vermiculite is thrown into

ladle. It forms an insulating layer on top of the steel to hold heat while ladle is moved to pouring or teeming operation. Steel is poured into ingot molds at about 2850°F. Degassed steel is more fluid, can be poured approximately 30°F lower than non-degassed steel.

Finkl started design work on this



Picture taken as cover of vacuum degassing chamber is swinging back after 12-minute degassing operation. Ladle will now be lifted out of chamber and carried to pouring or teeming operation

IDEAS

method in mid-1958, after extensive investigation of other degassing methods both here and in Europe. First trials were run in mid-1959. Currently, the company is degassing approximately 80% of its special steels, of which they make about 35,000 tons/yr on a one-shift, five-day week.

Preliminary estimates indicate that degassing will cost less than one cent per ton of steel.

Patents are now pending, and Finkl is planning to license the process.

(Further information may be obtained from A. Finkl & Sons Co., 2011 N. Southport, Chicago 14, Ill.)

Acid, base concentrations needed for given pH easily calculated

Problems involving concentration of buffer solutions can be immediately solved with aid of slide-rule-type pH calculator. Logarithm calculations are by-passed by scales which can be read directly to second decimal place.

In one setting, concentrations of acid and base (needed to make solution with given pH) are immediately given.



Slide rule calculator can be used to solve problems involving mass-action law

Calculator may be used for simple electrolytes, such as acetic or carbonic acid. It also may be used for polyelectrolyte mixtures. Any problem involving mass-action law can be solved.

(pH Calculator, which retails for \$4.85, is product of Educational Division, Graphic Calculator Company, 633 Plymouth Court, Chicago 5, Ill.)

BULK HANDLING PROBLEMS SOLVED:

the EFFICIENCY + the FLEXIBILITY of
of "automation" unit containers =



SYSTEM

Compare Tote—a complete, mechanical, automatic bulk handling system based on metal containers plus filling and discharging equipment—with a "push-button" fixed storage bin system. You'll find that Tote offers the advantages you want:

- Compact storage
- Surge capacity between processing and packaging operations
- Accurate and automatic weighing and blending

The labor cost of operating a Tote System is no greater, while the installation cost of a Tote System is much less.

IN ADDITION, Tote System retains the flexibility of unit containers:

- *Flexibility in Transportation:* Tote Bins can be shipped by rail or truck, or they can be retained in the plant and filled from bulk hopper cars or trucks.
- *Flexibility in Plant Layout and Procedures:* Tote System can be adapted easily to future requirements. Plant layouts can be changed simply by re-locating discharge stations. Operations can be expanded merely by procuring additional Bins. And the Bins can be used interchangeably for different products.

See Tote at Exposition of Chemical Industries, Coliseum, New York City, Nov. 30-Dec. 4. Booths 858-60.

Why not let our engineers survey your plant at no obligation? Meanwhile, write for new catalog containing complete details.

TOTE SYSTEM, INC.

*Tote and Tote System
Reg. U.S. Pat. Off.

680 So. 7th, Beatrice, Nebraska

Check 1125 opposite last page.

... another exclusive Development
from FALLS **FI** INDUSTRIES
.. the almost perfect frangible...



Impervite
IMPERVIOUS GRAPHITE

RUPTURE DISK

... is the most reliable, most economical method of protecting your pressured systems. Disks can be selected *easily* because the same disk can be used in practically any service, and studies indicate no change in burst characteristics due to fatigue. Replacement schedules and complicated inventory can be eliminated.

This disk is only one example of the outstanding processing equipment developments of Falls Industries. Use coupon at left for detailed bulletin on the IMPERVITE Rupture Disk, or other impervious graphite equipment.

FALLS **FI INDUSTRIES, INC.**
AURORA ROAD • SOLON, OHIO

Phone: CHurchill 8-5357

Teletype No. Solon 0-720

FALLS INDUSTRIES, INC.
31909 Aurora Rd., Solon, Ohio

SEND THE FOLLOWING LITERATURE:

- | | |
|---|---|
| <input type="checkbox"/> Bulletin No. 448 | <input type="checkbox"/> Bulletin No. 537 |
| <input type="checkbox"/> Bulletin No. 505 | <input type="checkbox"/> Bulletin No. 660 |
| <input type="checkbox"/> Bulletin No. 945-1 | <input type="checkbox"/> Bulletin No. 753-2 |
| <input type="checkbox"/> Bulletin No. 315 | <input type="checkbox"/> Bulletin No. 249 |
| <input type="checkbox"/> Bulletin No. 24 | <input type="checkbox"/> Bulletin No. 854-1 |
| <input type="checkbox"/> Bulletin No. 182 | |

NAME
TITLE
COMPANY
ADDRESS
CITY ZONE STATE

Accurate to $\pm 5\%$ of rated burst, even at low pressures—almost universally corrosion resistant—different operating temperatures will not affect burst—mounts in standard ASA Flanges—non-contaminating, non-porous, immune to thermal shock—recommended at 75% of rated vessel burst—100% clean rupture for maximum venting—and studies to date indicate no fatigue failure.

IMPERVITE Rupture Disks are available in diameters to 24" at burst pressures to above 250 psi, for almost any temperature. Each disk is supplied in separate, well-marked box.

SEE OUR CATALOGING IN C E C

TUBE AND SHELL EXCHANGERS incorporating latest design and standard. Bull. 448.

HCI ADSORBERS

HCI ADSORBERS and TOWERS including all standard types of towers as well as falling film type HCI absorbers. Bull. 505.

CROSS BORE EXCHANGERS accommodate pressures to 200 psi at temperatures to 400°F. Bull. 537.

PIPE, FITTINGS AND VALVES. Bull. 945-1.

RUPTURE DISKS made of impervious graphite display some truly amazing properties which save money for processors. Bull. 315.

FIELD SERVICE provides trained men for installation, relocation or repair of any impervious graphite equipment. Bull. 24.

CURICAL EXCHANGERS require only 1/4th the area as comparable capacity tube and shell design. Bull. 182.

CENTRIFUGAL PUMPS Bull. 854-1.

PLATE AND BAYONET HEATERS full line for tank heating requirements. Bull. 753-2.

COSTS AND STANDARDS of impervious graphite processing equipment. Bull. 249.

IMPERVITE

IMPERVITE

IMPERVITE

IMPERVITE

Cyanide waste disposal was becoming a headache at Micro Switch Div., Minneapolis-Honeywell. To meet peak demands of concentration and flow, excess of chlorine was used. Resulting fumes were a noxious nuisance. The air cleared quickly when proper instrumentation and . . .

Waste Treatment Controls Cut Chemical Costs Sharply

Problem: Cyanide waste disposal became a serious problem at Micro Switch Div. of Minneapolis-Honeywell when odors and toxic fumes prompted an entire department to move to another building. Disposal system became inadequate as additional processing operations raised volume of cyanide waste water to around 13,000 gal during two eight-hour shifts.

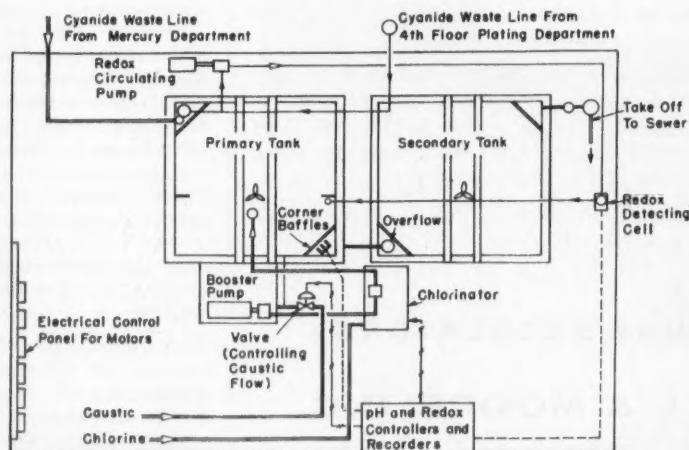
Waste contains about 24 lb of cyanide salts of various metals, such as cadmium, sodium, and silver. Local sanitary regulations required that all cyanide waste be oxidized to carbon dioxide and nitrogen before being emptied into any stream or river.

In existing system, waste water entered top of 9000-gal baffled tank. A circulating pump took it from opposite

end of tank at bottom and discharged solution back into top of tank near raw waste inlet. Liquid caustic soda was added in this circulating line to maintain correct alkalinity. A portion of circulating water was bypassed into fixed-flow chlorinator to pick up needed chlorine.

Since both flow rate and concentration of raw cyanide waste varied, this system did not work satisfactorily. Most of the waste had to be over chlorinated to provide for peak concentrations.

Solution: System was revised to provide: a modified flow-through batch process; and a control system to automatically regulate addition of caustic and chlorine in accordance with changes in both flow rate and concentration of cyanide waste.



Oxidation-reduction and pH controllers regulate addition of treatment chemicals in this cyanide waste disposal system

Waste Treatment Setup

In new process, two 1100-gal, rubber-lined agitated tanks are used. Cyanide waste is fed to primary tank where a portion is drawn from bottom of tank and, after addition of caustic and chlorine, is pumped back into top of same tank.

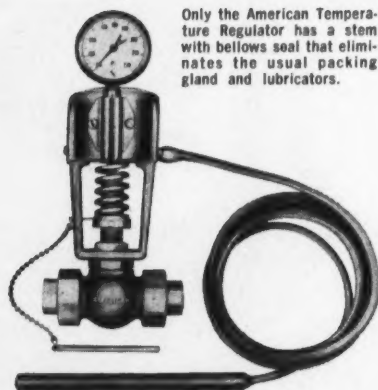
Chlorine oxidizes cyanides to cyanates almost immediately. Further oxidation, from cyanates to carbon dioxide and nitrogen, begins in primary tank and is completed in secondary tank. Carbon dioxide formed in this reaction combines with caustic soda to form harmless sodium carbonate.

To next page

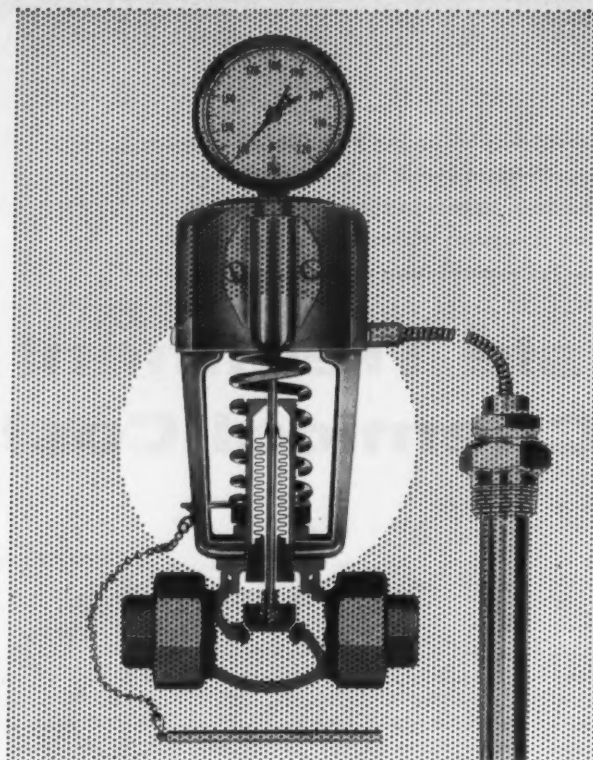


Control panel for cyanide waste disposal system. Proper process control has provided a 34% saving in chlorine and a 13% reduction in use of caustic soda

Temperature Regulation with Corrective Action within $\frac{1}{10}$ of a degree



Only the American Temperature Regulator has a stem with bellows seal that eliminates the usual packing gland and lubricators.



A friction-free bellows seals off the valve stem on the new American Temperature Regulator. Result: no stem binding to retard valve action, fastest possible temperature response.

The bellows seal makes practical a friction-free, nonleaking packless valve that needs no lubrication. This innovation plus an extra-long, preflexed adjusting spring marks the new American Temperature Regulator as the fastest acting, most stable available. Corrective action starts at less than $\frac{1}{10}$ degree change at the bulb. And the adjusting spring allows unusual latitude in temperature settings.

Compact design permits installation in "tight" locations. The dial thermometer on the indicating-type regulator can be positioned for easiest reading regardless of piping arrangements. Standardized parts and unitized assembly mean low initial cost. Maximum feasible use of stainless steel and a minimum number of components eliminate maintenance problems.

Get the best in economy, accurate temperature regulation, and dependability. Choose American Temperature Regulators. Sizes: $\frac{1}{2}$ " to $1\frac{1}{2}$ ". Temperature Ranges: As low as minus 15°F . to 50°F .—as high as 240°F . to 350°F . Valve: Bronze body, stainless steel seat and disc. Ask for Bulletin 114A.

Phone your industrial supply distributor for counsel, service and prompt delivery from his local stocks.



AMERICAN TEMPERATURE REGULATORS

A product of

MANNING, MAXWELL & MOORE, INC.

Consolidated Ashcroft Hancock Division • Stratford, Connecticut
In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

Check 1127 opposite last page.

INSTRUMENTS & LAB

From preceding page

Liquid overflows into secondary tank which acts as a holding and finishing basin. It also functions to eliminate possibility of a short circuit of waste water through primary tank directly to sewer.

At present rate of flow (13,000 gal during two eight-hour shifts), waste water is held in each tank for about an hour and twenty minutes.

Addition of treatment chemicals is regulated by two recording pneumatic controllers each equipped with a pneumatic proportional-plus-reset control unit which compensates for load changes such as variations in flow rate or concentration of waste.

Desired chemical reactions take place at maximum rate with minimum formation of toxic gases at a pH of 9 to 10. Sensing elements for pH are located near primary tank discharge to circulation booster pump (see diagram). When pH drops, recorder-controller opens diaphragm control valve in caustic line until proper pH is restored. Caustic is added on suction side of booster pump.

A continuous sample of raw waste water is taken from a location near inlet of primary tank and circulated through a Redox sensing cell. Based on oxidation-reduction potential of this raw waste water, second recorder-controller decreases or increases flow of chlorine to maintain 15 ppm of residual chlorine in treated waste water.

Results: All toxic fumes and odors have been completely eliminated. Frequent checks have detected no trace of either cyanogen chloride or chlorine in atmosphere.

A bonus resulting from efficient control system has been a considerable reduction in use of treatment chemicals. Use of chlorine has been cut by 34% and caustic soda by 13%.

(ElectroniK recording controllers and accessory instruments were supplied by Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Wayne & Windrim Ave, Philadelphia 44, Pa.)

Check 1128 opposite last page.

**Flow of water, sewage
measured in-stream**

Eliminate stilling-well need
with float riding in channel

Uses: In-stream flow transmitter for water and sewage industries.

Features: Six-inch expanded polystyrene float rides directly in channel at proper metering location. Since float motion is vertical, radial correction is not required. Eliminates need for stilling well, flushing systems, float well cover, connecting piping, sediment tanks, blow-down valves, and frequent cleaning.

Description: Manufacturer's telemeters permit unlimited-distance operation between transmitter and receiver with choice of transmission over telephone lines or private. One transmitter may operate several receivers.

Response to flow change is quicker since float is in-stream. Transmitter is mounted above channel away from hazard of floods.

All parts are corrosion-resistant. Existing instruments may be adapted to in-stream metering.

(Chronoflo flow transmitter is product of Builders-Providence Division, B-I-F Industries, Inc., 345 Harris Ave., Providence 1, R.I.)

Check 1129 opposite last page.

Teflon laboratory ware

... now being marketed is said to eliminate the hazards and inconveniences of breakable glass ware. Polytetrafluoroethylene properties include chemical inertness, temperature range from -450°F to $+550^{\circ}\text{F}$, flexural and tensile strengths.

Line includes stirring rods; watch glasses; standard, micro, and semi-micro beakers; evaporating dishes; and tubing.

(Shameco Teflon laboratory ware is product of W. S. Shamban & Co., 11617 W. Jefferson Blvd., Culver City, California.)

Check 1130 opposite last page.

**This Bailey Instrument
measures both oxygen
and combustibles!**

You can measure oxygen and combustibles with this Bailey Analyzer-Recorder . . . at less than the price of other instruments that make only single measurements.

Bailey gives you a continuous recording of *both* on the same chart for quick, simple comparison.

Speed of response is second to none . . . due to the catalytic combustion measuring unit and a high speed sampling system.

Accurate analysis and stable calibration enable the operator to keep fuel-burning equipment performing continuously in the zone of maximum combustion for greater throughput. It is possible for fuel savings, alone, to pay for the instrument.

A Bailey Engineer will be glad to call at your plant and explain how this and other advanced Bailey instruments and controls can help you to greater processing efficiencies. Or write our Chemical and Petroleum Division.

Bailey Analyzer-Recorder at petro-chem furnaces of Continental Oil Company, Westlake, La.

CP108-1

Chemical and petroleum division
BAILEY METER COMPANY
1074 IVANHOE ROAD • CLEVELAND 10, OHIO
In Canada—Bailey Meter Company Limited, Montreal



Check 1131 opposite last page.



C_v COMPARISON TABLE

Valve Size	K & M	Valve B	Valve C
3/4"	10.9	8.4	8
1"	17.3	14.9	13
1 1/2"	39.1	33.2	28
2"	61	57	48
2 1/2"	97.7	71.0	72
3"	150	116	100
4"	219	197	165
6"	500	384	360

Based on the maximum C_v of rated travel through the valve body. From manufacturers' most recent slide rules or tables.

**K & M
GIVES YOU
THE MOST VALVE
FOR YOUR DOLLAR**

averaging highest in C_v ratings

When you are buying control valves, one of the most important points to consider is flow capacity, or C_v. Valves of the same nominal size won't necessarily deliver the same flow output, which is what you're paying for.

K & M valves give you the highest C_v's available. This is not an extravagant claim derived from estimates or theoretical calculations; it is based on actual hydraulic tests.

The accompanying table will show you just how much higher is K & M's flow capacity. Sometimes, this greater efficiency permits the use of the next smaller size valve—at a substantial dollar saving. Always, it provides better controllability: fluid flow is smoother, less turbulent, with lower pressure loss through the valve body.

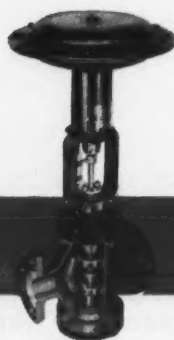
With K & M, you get what you pay for—and then some.

SEND FOR BULLETIN CV53.



diaphragm control valves

Our 80th Year



KIELEY & MUELLER, INCORPORATED

Oldest Pressure and Level Control Valve Manufacturer
64 Genung Street, Middletown, New York

Check 1132 opposite last page.

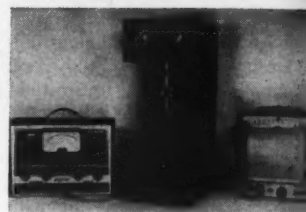
INSTRUMENTS & LAB

Polymeric-thickness cure measured at 0.7 mils

Uses: Measurement of penetration hardness and resiliency or cure of polymeric materials.

Features: Tester measures cure of polymeric materials from 125 to 0.7 mils thickness. Fifteen-second variation in bake time at 325°F has been detected by instrument.

Description: Penetration tester consists of three components. These are Vicat-type penetrating needle test unit,



Penetration tester can detect 15-sec variation in bake time at 325°F

regulated power supply for needle motion transducer and millivolt strip-chart recorder for plotting penetration of needle and elastic recovery of material.

(Continental cure tester is product of Thwing-Albert Instrument Company, Penn St. & Pulaski Ave., Philadelphia 44, Pa.)

Check 1133 opposite last page.

Offer hydrofluoric acid in single-trip package for safety, economy

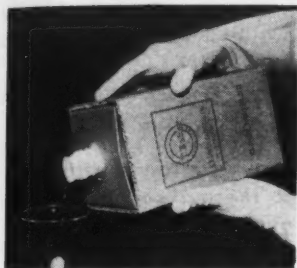
Plastic bottle overwrapped in corrugated sleeved box

Safety and durability in handling are combined in throw-away package developed for shipping hydrofluoric acid from J. T. Baker Chemical Co., Phillipsburg, N.J.

Container in 10-lb size is 5 3/4" square and 11 3/4" high, consisting of lightweight polyethylene bottle overwrapped in corrugated sleeved box.

Top of container is "zipped" off by pulling tape. Because hands never touch polyethylene container, and since

square shape makes it easy to hold and pour from, container has high safety rating. Bottle does not have diaphragm which must be punctured, minimizing hazard of "acid-sput."



Ease of handling of hydrofluoric acid in throw-away container is demonstrated

Four units may be shipped in carton and disposed of after use.

Technical and reagent grade acid are being offered in 10-lb package, and in similar 1-lb package.

(Hydrofluoric acid in Thro-A-Way containers is being marketed by J. T. Baker Chemical Co., Phillipsburg, New Jersey.)

Check 1134 opposite last page.

(Polyethylene bottles are products of Plax Corporation, Granby St., Bloomfield, Conn.)

Check 1135 opposite last page.

(Corrugated sleeved box was developed by Hinde and Dauch Division, West Virginia Pulp & Paper Co., Sandusky, Ohio.)

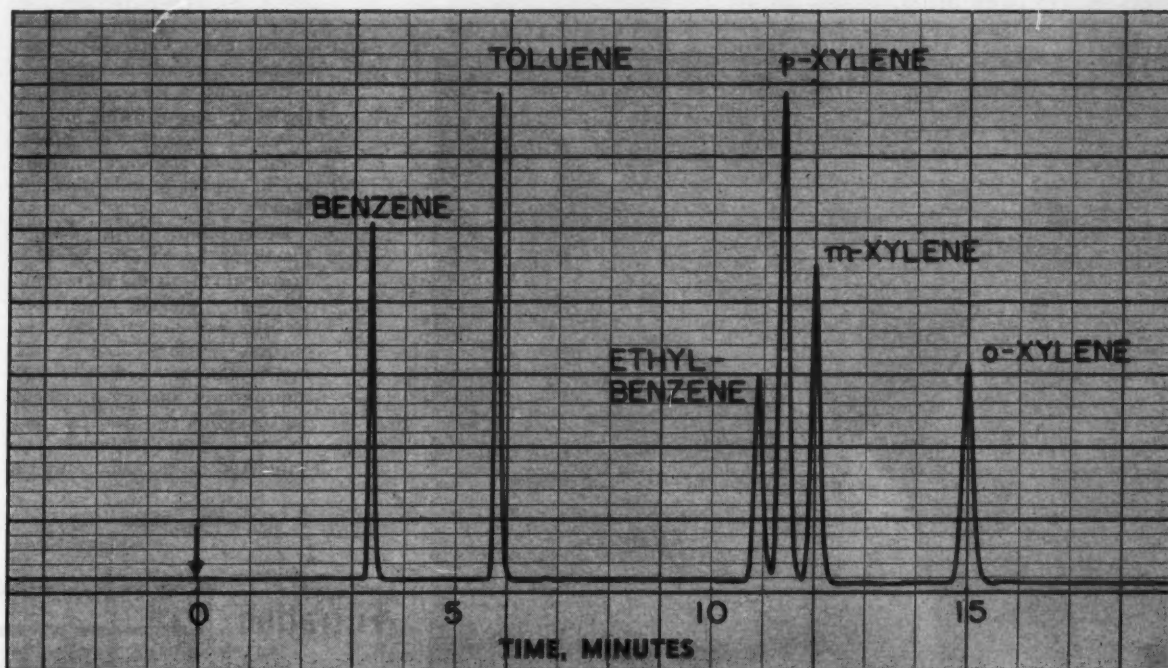
Check 1136 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Gas chromatography, including basic theory, proper instrumentation design, column technology, and applications, is covered in 71-page workbook. Manual may be purchased — \$5.00 each — through dealers handling products of Scientific and Process Instruments Division, Beckman Instruments, Inc., Fullerton, Calif.

Another Wheelco first—

New tritium detector means less base line noise, greater sensitivity.



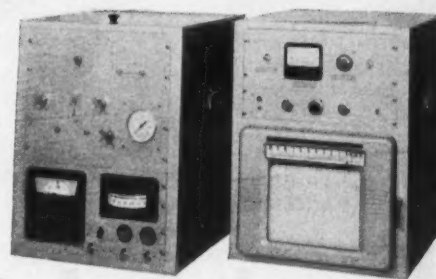
Chromatogram showing complete separation of xylenes using tritium detector and 60-ft stainless steel capillary column. Temperature, 67°C; flow rate, 0.7 ml/min Argon.

Now Wheelco offers a new tritium detector — to 225°C — in addition to the time-proved ionization detectors using strontium 90 and radium. Sensitivity is greater because tritium detectors have less base line noise than any other radioactive source: 1/3 as noisy as strontium and 1/30 as noisy as radium.

With a tritium source the detector offers the ultimate in simplicity and can be cleaned regularly. Long life with practically no maintenance or replacement is assured.

Outstanding operating flexibility is provided because the same detector can be used for capillary or packed columns.

See Wheelco first before selecting any chromatography equipment. New developments based on extensive field experience keep Wheelco ahead of the rest.



Model 20 is a compact, portable unit designed to use both capillary and packed columns. Wheelco also builds the Model 10, a laboratory unit for single or dual operation.



Wheelco Instruments Division

BARBER-COLMAN COMPANY

Dept. V, 1520 Rock Street, Rockford, Illinois, U.S.A.

Check 1137 opposite last page.

KEEP YOUR POWDER DESERT-DRY WITH LECTRODRYER

When you're processing powdered or granular hygroscopic materials, Lectrodryer is the solution to air moisture problems. These machines dry air to dewpoints as low as -110°F . You can choose automatic or manually controlled units, for continuous or intermittent operation. Tell us about your drying problem — we'll advise you how Lectrodryer custom-engineered or standard units can help you. Write Pittsburgh Lectrodryer Division, McGraw-Edison Company, 352 32nd Street, Pittsburgh 30, Pennsylvania.



Lectrodryer®

McGraw-Edison

Check 1138 opposite last page.

INSTRUMENTS & LAB

Vacuum test chamber extends usefulness of plastograph

Attachment permits measuring of plasticity in vacua

Uses: Testing plasticity of pasty or highly viscous materials under vacuum.

Features: Vacuum test chamber extends usefulness of instrument in measuring plasticity. It can operate down to 5 mm of mercury with a large number of standard measuring heads for a wide plasticity range.

Description: Unit records plasticity by measuring force required to drive a kneader through material under test. Results are automatically recorded. Various sensing elements can be used to closely approximate mixing and beating machinery used in production. Test materials are subjected to the same material

and structural changes, under constant recording of stress and shear resistance, as are encountered in large-scale production.

(Plastograph and vacuum test chamber attachment are products of C. W. Brabender Instruments, Inc., 50 E. Wesley St., South Hackensack, New Jersey.)

Check 1139 opposite last page.

Line detector sensitive to thermal conditions over entire length

Tube may be bent as desired and joined into series

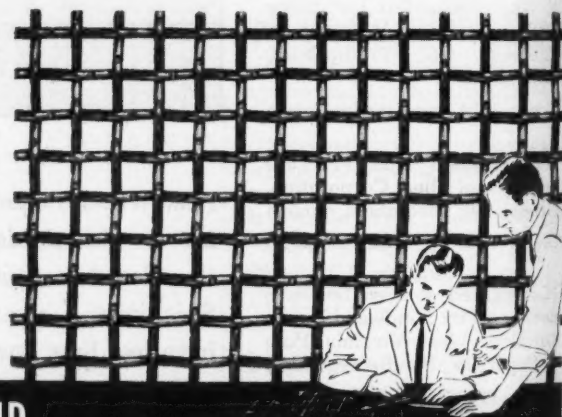
Uses: Monitoring of temperature in such applications as nuclear reactors, catalyst beds, bearing overheats, petroleum processing, and other areas where detection of random "hot spots" is desirable.

Filtration

Straining

Screening

Catalysts



CLEVELAND

Has the Answer to All Wire Cloth Problems

Whether your problem is bulk or fabricated parts, filtering, straining, screening or catalyst, get in touch with Cleveland. Over 40 years experience in the weaving and fabrication of industrial wire cloth provides the answers to your screen problems.

Immediate shipment of many standard meshes or weaves from stock. Fabrication into products is our engineering specialty.

SEE OUR AD IN CEC

Send your specifications or call today. We'll be glad to consult with you on your wire cloth problems without delay. Ask for Bulletin No. 10.

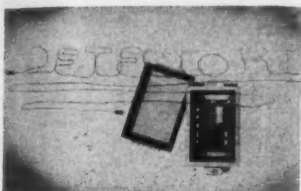
THE CLEVELAND WIRE CLOTH & MFG. CO.
3577 EAST 72nd STREET, CLEVELAND 9, OHIO • DI 1-1832

Check 1140 opposite last page.

CHEMICAL PROCESSING

Features: Line detector is responsive to thermal conditions over entire length, instead of being sensitive only at several pre-determined spots.

Description: Based on temperature-resistance relation-



Flexibility of line temperature detector can be seen in photo which also shows control unit with cover removed to show inner assembly

ship of selected eutectic salt mixtures, detector consists of an Inconel tube into which salts are packed around nickel-wire center conductor.

When temperature attains

set point, circuit between conductor and outer tube is shorted. This is sensed by control unit which actuates alarm or other device.

Tubing may be bent and standard elements connected in series to form lengths of several hundred feet. In one such system several different temperatures can be detected.

Instrument is now available for temperatures of 255, 310, 400, 575, 765, 900, 1050, and 1200°F.

(Line Temperature Detectors are manufactured by Fenwal Incorporated, Pleasant St., Ashland, Mass.)

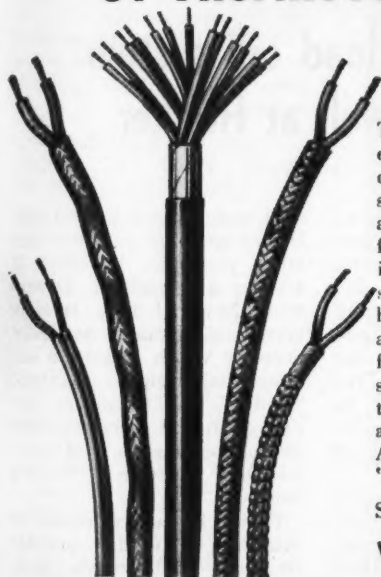
Check 1141 opposite last page.

Electric eyes and their applications for process industries are discussed by means of problem-solution format in Bul 522—Photomation, Inc., 96 South Washington Ave., Bergenfield, N. J.

Check 1142 opposite last page.

Choose From The Widest Variety Of Thermocouple Wires

Over 1500 Different Types



T-E's tremendous variety of thermocouple extension wires assures you quick delivery of every type and size—from one reliable source. Dependable quality control is also assured by T-E's own complete facilities for wire drawing, insulating and calibrating. T-E duplex wires come in solid or stranded construction, in all standard calibrations. The latest types of insulation and metallic armor overbraid protect them from all atmospheric, chemical and abrasive conditions. From 6 to 56 pairs of T-E thermocouple leads can now be installed at one time with the new "Thermo-Cable". Also available—a complete selection of "MIL"-Spec Wire.

See Our Full Line—

Write for Wire Bulletin 32WS-R

Thermo Electric CO., INC.
SADDLE BROOK, NEW JERSEY

In Canada:
THERMO ELECTRIC (Canada) LTD.,
Brampton, Ont.

Check 1143 opposite last page.

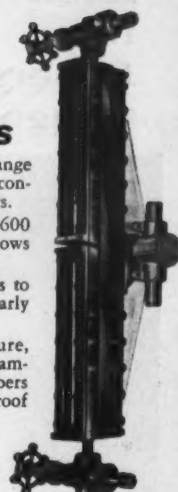
OCTOBER 1959

MEASURE
MIX
PUMP
EXHAUST
WASH
AERATE
AGITATE
COMPRESS
ATOMIZE
CIRCULATE
INJECT
EXTRACT

PENBERTHY Direct Reading LIQUID LEVEL GAGES

Designed with exclusive features for range of pressures, temperatures, corrosive conditions or other specific requirements.

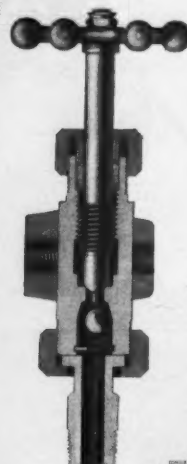
- **REFLEX** — 3 pressure groups to 3600 psig. Lengths to 12 ft. Liquid shows black for positive accuracy.
- **TRANSPARENT** — 4 pressure groups to 10,000 psig. Lengths to 12 ft. Clearly shows color, density on media.
- **SPECIAL SERVICE** — High pressure, Frost-Proof, Heating Tube and Chamber, Welding Pad, Large Chambers and Inclined Gages, Explosion-Proof Illuminator.



PENBERTHY GAGE VALVES

Exclusive "floating shank" saves on installation, eliminates strains common to forced installations.

- Threaded Valves for service to 6000 PSI
- Threaded Valves for service to 1500 PSI
- Stuffing Box Valves for service to 750 PSI
- Special Valves and Accessories.



PENBERTHY EJECTORS

Hydraulic, air and steam operated Penberthy ejectors (jet pumps, eductors, exhausters and syphons) simplify handling of fluids, vapors, gases and "hot" materials. In a variety of standard and special designs and materials.



PENBERTHY SUMP PUMPS

Automatic, electric, explosion-proof, submersible and standard types in 8 models, 20 sizes.



Your request for literature or specific engineering data, for any or all Penberthy products, will receive prompt, personal attention.

PENBERTHY MANUFACTURING COMPANY

Division of Buffalo-Eclipse Corporation

1242 Holden Avenue

Detroit 2, Michigan

There's Certain Satisfaction

in PRODUCTS BY

PENBERTHY

- EJECTORS
- INJECTORS
- CYCLING JET PUMPS
- LIQUID LEVEL GAGES
- GAGE VALVES
- SUMP PUMPS

Check 1144 opposite last page.

Look into Lonergan Gauges



Look into a Lonergan Maximon Gauge and you'll see the reasons why they are preferred where positive performance, accuracy and long life are required.

First the case. Here's the material to fit your needs—cast iron, cast brass, aluminum, or phenolic plastic. In addition, field conversion of the Maximon gauge to a Saf-T-Kase can be made by purchasing a low-cost Saf-T-Kit.

Look at the Bourdon tube. The precision finish of the alloy, stainless, K-Monel or Beryllium copper means longer life.

Look at the geared rotary movement that gives uniform motion and simplified recalibration. Note the dissimilar metals that reduce wear, preserve tolerance and maintain accuracy to $\frac{1}{2}$ of 1% of the maximum graduation.

Full details on Lonergan Maximon Gauges, for process industries plus utility and industrial gauges and accessories are available in Catalog 1000 G. Write for your copy today to the address shown below.

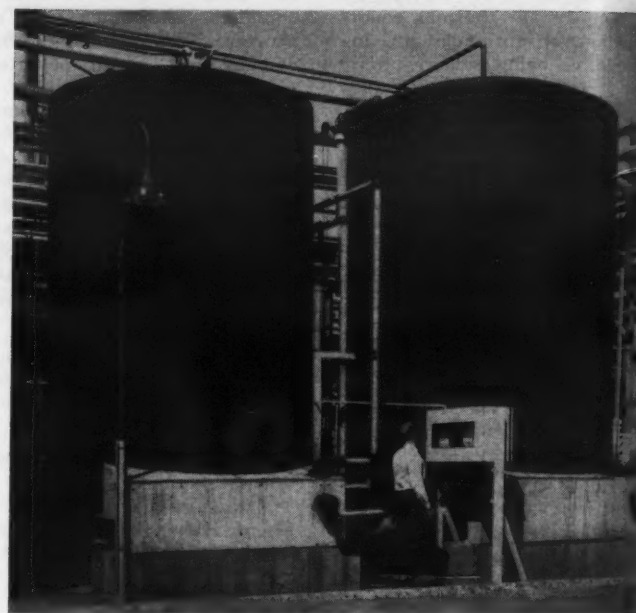
Lonergan

J. E. LONERGAN CO., 203 RACE STREET
PHILADELPHIA 6, PA. SINCE 1872



Check 1145 opposite last page.

PROCESS INSTRUMENTATION and LABORATORY APPARATUS



Accurately determining weight of a stored chemical that varies in density poses a problem that is further complicated when weighing system must be reliable over long periods with minimum maintenance

Hydraulic load cell system weighs well at Hooker

Problem: At the Montague, Michigan, plant of Hooker Chemical Corp., an accurate, maintenance-free system for continuously determining weight of stored hexachlorocyclopentadiene is important to processing operations. Five tanks hold from 55,000 to 110,000 lb of material of varying quality during course of manufacture.

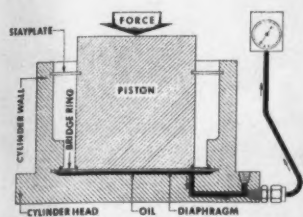
Because of varying density, level indicators were not considered sufficiently accurate. Mechanical weighing systems were prone to wear and needed periodic cleaning.

Solution: A hydraulic load-cell weighing system was installed to monitor quantity of material in each of the five vertical storage tanks. Each

tank is supported by one cell. Device operates on piston-cylinder principle. In effect it acts as a transducer. Downward force of tank is converted into suitable hydraulic pressure which is used to actuate dial weight indicators. "Rolling ball" support arrangement accommodates normal expansion and contraction of tank being weighed.

Piston is held centrally in cylinder by a flat, annular stayplate and bridge ring. Above piston, and separating it from loading head, is a rolling steel ball sandwiched between two hardened steel inserts. As tank expands, ball rolls and center of loading rolls on inserts. Downward

Operator checks weight of material in two storage tanks at Hooker Chemical Corp., Montague, Michigan. Hydraulic load-cell system provides accurate indication of weight regardless of density of stored material



Schematic cross section of load cell shows how force is hydraulically transmitted to dial weight indicator

force is thus transmitted from loading head to piston independent of any tank movement caused by expansion or contraction. Rolling-ball loading head also allows for any tipping of surface to which it is attached without exerting any undesirable loading on cell.

Results: Hydraulic load-cell weighing system provides virtually maintenance-free indication of quantity of material in tanks regardless of density. Accuracy is estimated to be within $\pm 0.5\%$.

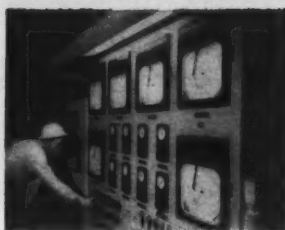
(Hydraulic load-cell system is supplied by A. H. Emery Co., New Canaan, Conn.)

Check 1146 opposite last page.



"These darn off-brand, cheap, substitute, no-good machines!"

These Bristol Instruments at Lithium Corporation of America, Bessemer City, N. C., are part of an extensive installation that keeps tabs on such variables as temperature, pressure, absolute pressure, flow, liquid level, and pH.



Almost
every industry
can benefit

from

BRISTOL INSTRUMENTATION



Here's an outstanding example of the way Bristol is helping thousands of industrial processes today:

In Lithium Corporation of America's plant for extraction of vital lithium compounds, located in Bessemer City, North Carolina, near this nation's largest ore deposits, precision Bristol instruments monitor and control practically every step of the extraction process.

From the early planning stages, Bristol instrument engineers worked closely with Lithium Corporation engineers in designing the instrument system for this modern plant. Temperature, pressure, absolute pressure or vacuum, flow, liquid level, and pH had to be recorded or controlled at a multitude of points in the complex extraction process. The Bristol instru-

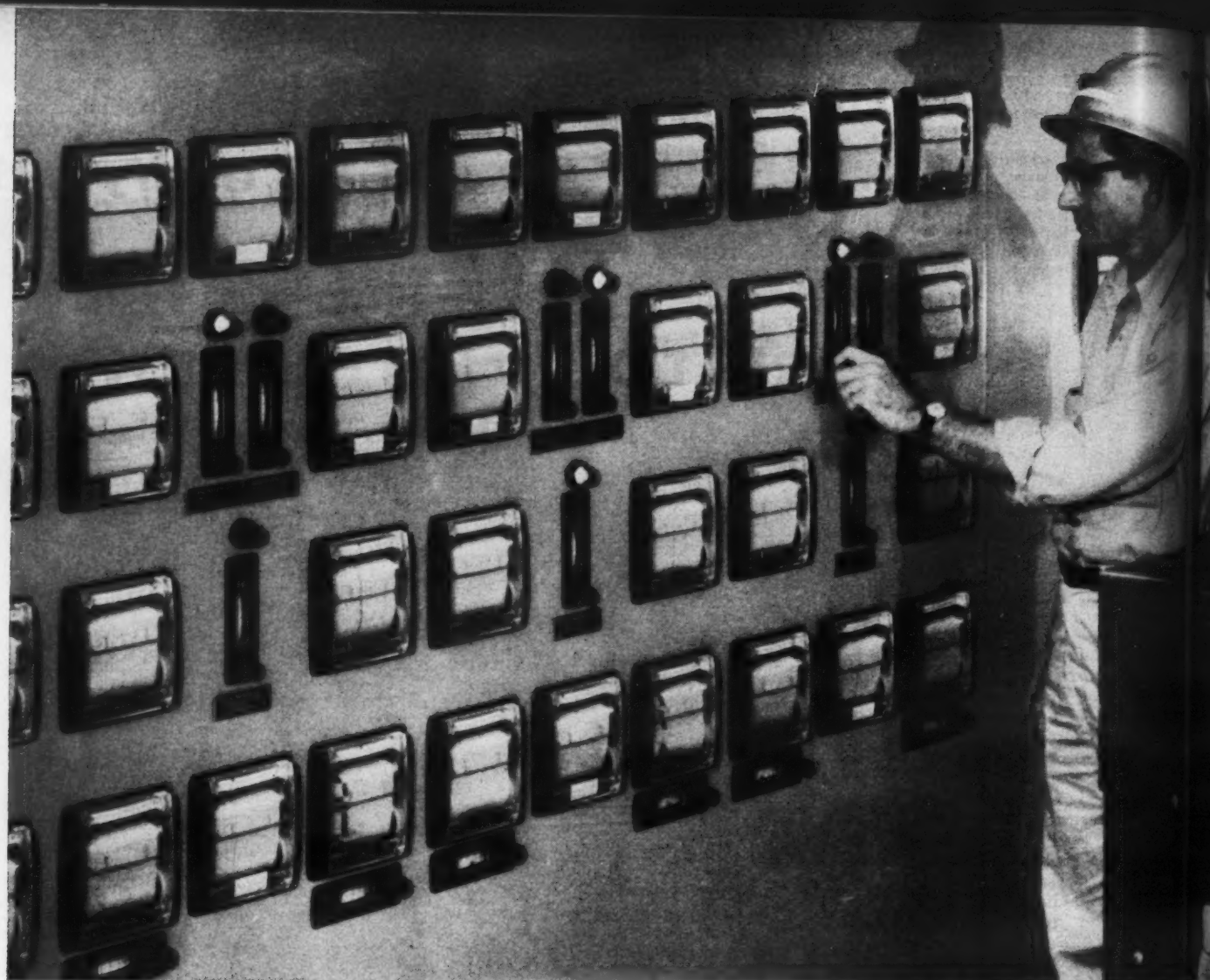
ments used included electronic Dynamaster* potentiometers and pyrometers, pneumatic and time program controllers. In operation for nearly four years now, the Bristol instruments have been doing a precise job of recording and controlling despite vibration and a corrosive, dusty environment.

This is just one example of the way Bristol can work with you in selecting the *right* instruments for your process. Bristol makes the most complete line on the market of full-size and miniature instruments for measurement, recording, automatic control and telemetering of almost every industrial variable. And Bristol Application Engineers are always ready to advise and assist you in applying them to your process. Write: The Bristol Company, 141 Bristol Road, Waterbury 20, Conn.

*T.M. Reg. U. S. Pat. Off. 8-48

BRISTOL TRAIL-BLAZERS IN PROCESS AUTOMATION
AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

Check 1147 opposite last page.



Foxboro Consotrol control panel at W. R. Grace & Co. polyethylene plant in Baton Rouge, Louisiana.

Foxboro Consotrols* help put 50 million pound

"Perfect instrument performance on start-up," reports W. R. Grace & Co.'s

50 million pounds of GREX — W. R. Grace & Co.'s new high strength plastic resin — that's the capacity of their new Polymer Chemicals Division plant in Baton Rouge, La. Instrumentation for the 30 acre, multi-million dollar facility was supplied by The Foxboro Company.

"Our main Foxboro panel was a big help in getting this temperature-controlled process off to a successful start," reports instrument supervisor Al Farris. "Over 95% of the variables on the panel are con-

*Reg. U.S. Pat. Off.

trolled — many of the key ones are part of cascade control systems. Instrument performance on start-up was perfect."

Grace instrument men like their Foxboro pneumatic Consotrols for other reasons as well: The M/54 Recorder's 4-inch vertical-travel chart . . . the drawer-type pull-out feature of Consotrols . . . the fact that in 18 months of operation not a single Consotrol has needed re-calibration.

Foxboro Consotrol instrumentation includes con-



polyethylene plant on stream without a hitch

Polymer Chemicals Division

control functions for all types of processing requirements — auto-selector . . . cascade and ratio systems . . . automatic batch control. Get the complete story by writing for Bulletin 13-18. The Foxboro Company, 8110 Neponset Ave., Foxboro, Mass.

FOXBORO

REG. U.S. PAT. OFF.

30-acre W. R. Grace & Co. Polymer Chemicals Division plant has 50 million pound annual capacity. First product — new high strength plastic resin tradenamed GREX.



For more information on product at left, specify 1148 see information request blank opposite last page.



how to meter small quantities of liquid accurately

INSTRUMENTS & LAB

Fixed gases analyzed by ionization detector

Uses: Ionization detector for gas and vapor chromatography.

Features: Rated 1000 times more sensitive than thermal-conductive type. Analyzes wide range of compounds, including fixed gases.

Description: Simple and compact in design, detector in operation responds to sample rather than carrier. Electrons for ionization are supplied by emission.

Unit isn't adversely affected by variations in temperature or pressure. Flow may be interrupted for sampling, but is held constant during analysis. Unit is suitable for use with either capillary or packed columns.

Helium and argon are preferred carriers. Flexibility for special techniques is provided by ready control of ionizing energy.

(Ionization detector is innovation of Burrell Corporation, 2223 Fifth Ave., Pittsburgh 19, Pennsylvania.)

Check 1150 opposite last page.

Automatic performance of time-temperature-humidity tests

Uses: For tests requiring control of humidity and temperature.

Features: All-in-one instrumentation permits simultaneous, automatic performance of time-temperature-humidity experiments.

Description: Controlled-relative-humidity cabinet is supplemented with combination cam-type programmer-recorder-controller housed in separate dual-compartment steel floor stand.

Unit has vapor-pressure system, adjustable air volume, shielded conditioning chamber, low-voltage control circuit, standard overtemperature protection, and inner glass door.

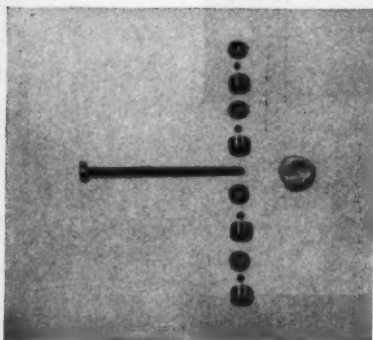
Constructed of 18-8 stainless steel inside and out, double-wall cabinet is insulated with 3" glass fiber, and is

CHEMICAL PROCESSING

THERE'S no basic change in the physical properties of a liquid whether you pump large or small volumes. But as the volume being pumped approaches the milliliters per hour (ml/hr) range, several constant characteristics of liquids tend to become serious problems. Metering success depends on how well these problems are solved by pump design and operating practice.

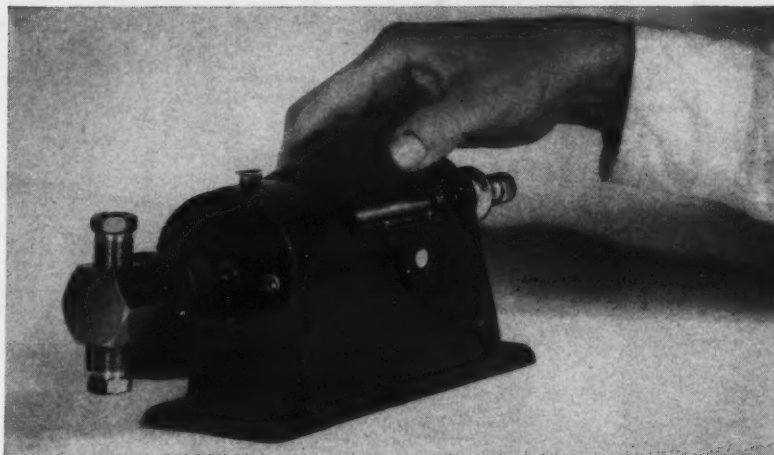
Compressibility:

All liquids are compressible, but so slightly that there is rarely much cause for concern. In small volume metering, however, the 0.027% reduction in volume of water which accompanies each additional 100 psi pressure can represent a 0.3% loss in pumping efficiency. Thus the existence of high or fluctuating discharge pressures *must* be considered when choosing a micro pump.



Entrapped air:

Bubbles can be troublesome even in high capacity controlled volume pumps. But when you're metering at the rate of 1/60 ml per stroke to 0.3% accuracy, a bubble can spell disaster. Good pump design can minimize the bubble problem by speeding bubbles through the liquid end in a very few strokes, but only good pumping practice can eliminate it. In our experience, there is



no substitute for a deaerator in the line.

Viscosity:

Low viscosity liquids tend to pass between any but the most perfectly mated ball checks and seats. Ball seating techniques recently introduced by Milton Roy have eliminated this problem, however, and extended the number of liquids that can be accurately pumped in small volumes. For example, a miniPump® is now successfully pumping 85 ml/hr of cyclohexane against a discharge pressure of 1,000 psi to an accuracy of $\pm 0.6\%$.

Minute volumes also impose tight specifications on the pump itself. Plungers, balls, and seats must be finished to a degree of near perfection. Parts are inspected under powerful microscopes for any sign of imperfections. Proper mating of balls and seats is so critical that a rigorous functional test is necessary.

Solving these unusual problems demands such special equipment as the Milton Roy miniPump, and special pumping practices. Together they permit numerous

metering jobs not otherwise possible. MiniPumps are standard equipment wherever small volumes of expensive or dangerous liquids are to be accurately metered into large process streams: perfumes into soap, dyes into cheese, odorants into natural gas, and hydrazine and other amines into boiler water. MiniPumps have also proved themselves in the chromatographic analysis of amino acids, feeding influent buffers to the columns and accurately introducing ninhydrin reagent to the effluent.

If precision pumping of small volumes of liquid is one of your problems, look to Milton Roy's 25 years of experience for your most economical solution. For more detailed information on miniPumps, write for Bulletin 1257-1. Milton Roy Company, 1300 East Mermaid Lane, Phila. 18, Pennsylvania.



Controlled Volume Pumps • Quantichem Analyzers
Chemical Feed Systems • pH Instruments

Check 1149 opposite last page.

equipped with wet and dry bulb controls.

Programmer-recorder-controller is 12" in diameter. It has 24-hour chart drive, range of 0 to 200°F, dual compartments for wet/dry bulb control, and simultaneous recording of wet/dry bulb temperatures.

Supplied with two blank cams, charts, and all accessories, unit is ready to operate for 115 or 230v 60-cy AC.

(Controlled-humidity cabinet with programmer-recorder-controller is product of Blue M Electric Company, 138th and Chatham St., Blue Island, Ill.)

Check 1151 opposite last page.

Analog tape recorder handles frequencies as high as 250 kc

Air-lubricated tape guiding lessens flutter, friction

Uses: Recording analog data.

Features: Records frequencies as high as 250 kc directly. Also offers all-solid-state electronics.

Description: Flutter characteristics are lowered through use of air-lubricated tape guiding which also reduces friction by eliminating physical contact between tape and guide. In turn, this provides faster starts and less tape wear.

Wide-band recording techniques for both FM and direct recording are incorporated. FM response is from DC to 20 kc within ½ db.

FM, pulse-duration modulation, direct, or digital recording modes are available through plug-in amplifier modules. Plug-in heads operate on special sliding carriages to minimize tape and head wear by lifting tape from the heads during rewind.

Machine accepts ½ and 1" tape interchangeably on 10½ and 14" reels.

(FR-600 recorder is development of Instrumentation Division of Ampex Corporation, 934 Charter St., Redwood City, California.)

Check 1152 opposite last page.

New!

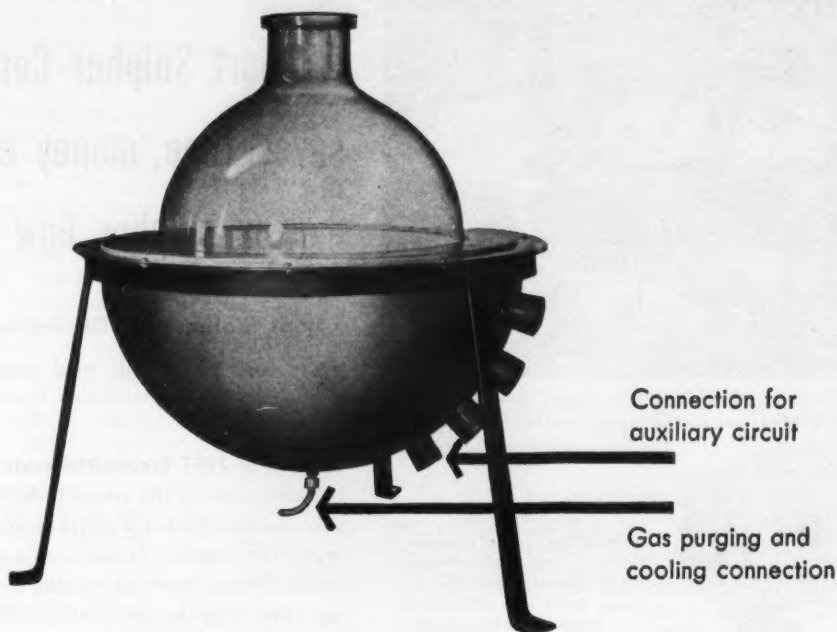
Here's the ultimate in safety and control for distillation and fractionation processes . . .

...the series U

Glas-Col Heating Mantle

... with small auxiliary circuit to supply vaporization heat for high-boiling residues*

... with special connections for gas purging and cooling**



AUXILIARY CIRCUIT: Each Glas-Col Series U Heating Mantle includes a small auxiliary circuit at the bottom, center.

When a small amount of high-boiling residue remains in the flask, this circuit can be used to furnish the heat of vaporization . . . while the upper circuits are turned off or operated at reduced heat input. This prevents superheating of the bare wall of the flask above the liquid level, and thus eliminates damage to flask, damage to heat-sensitive chemicals, and superheating of vapors before they reach the column.

At the beginning of a fractionation, when the flask is full of liquid, the upper circuits can be adjusted so input is just INSUFFICIENT to maintain the desired rate of flux.

THEN the small auxiliary circuit can be cut in and out to obtain the desired reflux rate.

GAS PURGING AND COOLING CONNECTION: Fire hazards are eliminated because heating elements can be continuously blanketed by a slow stream of inert gas such as nitrogen, which is bled in through a special connection.

And cooling can also be accomplished by passing air into the special connection and through the mantle housing.

Sizes and Prices: Glas-Col Series U Mantles are available for flask sizes ranging from 1 liter through 22 liters. Made with quartz fabrics, Series U Mantles are designed to operate at temperatures to 650°F. Prices range from \$34.00 to \$144.00.

Safety and control to the last drop!

GLAS-COL

Electric Heating Mantles

*U. S. Patent No. 2,739,220



**U. S. Patent No. 2,739,221

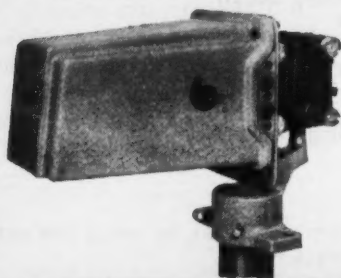
Glas-Col Apparatus Co., Inc.
Dept. CP
711 Hulman Street
Terre Haute, Indiana

New Bulletin! For more detailed information, ask for Bulletin 4-D

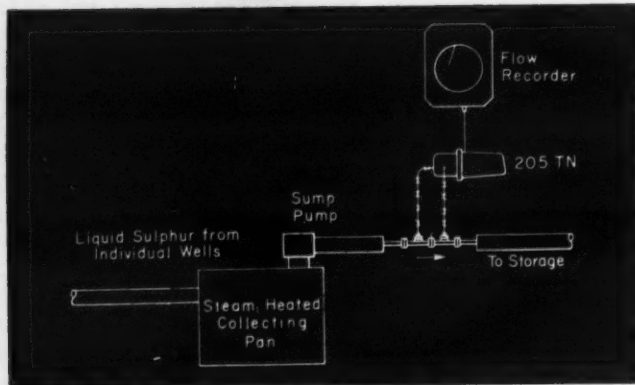
Check 1153 opposite last page.



205T Volumetric Differential Pressure Transmitter measuring molten sulphur flow at Freeport Sulphur Company's mines in Louisiana.



No pocketing . . . no purging . . . no plugging . . . with this low-cost transmitter designed for flow, level and differential pressure measurement.



Two all-welded stainless steel sensing diaphragms installed in the pipeline eliminate the need for steam tracing of the lead lines. Result—quicker, less expensive installation; negligible maintenance; process shut-down eliminated.

Freeport Sulphur Company saves time, money on molten sulphur flow control

**Taylor Volumetric DP Transmitter
costs less to install and maintain**

The Taylor 205T Transmitter costs less to install because none of the steam jacketing and insulation needed for a conventional aneroid meter is required. There is no need to insulate leads or meter body, since sulphur comes in contact only with the pressure sensitive diaphragms located either side of the orifice plate in the pipeline.

It costs less to maintain since molten sulphur does not enter any portion of the instrument—no chance of corrosion, no costly clean-out necessary.

Utilizing the force-balance principle, coupled with sealed silicone-filled sensing systems, the 205T Transmitter is the ideal, economical way to eliminate purge and seal problems as well as costly steam tracing. Accurate, sturdy, dependable and low-cost, it can solve your most difficult flow and liquid level measurement problems.

Ask your Taylor Field Engineer for full details, or write for **Bulletin 98281**. Taylor Instrument Companies, Rochester, N.Y., or Toronto, Ont.

INSTRUMENTS & LAB

**Registers liquid levels
within 1/16" or less
in lines, vessels**

Sensor resists pressure up to
250 psi at -297°F

Uses: Detects presence or absence of cryogenic liquids or fuels in transfer line or vessel.

Features: Registers level of liquid gases and fuels within 1/16" or less and withstands maximum pressure of 250 psi at -297°F and liquid velocity of 18' per second.

Description: A three-part control unit, the sensor consists of detector probe, amplifier, and connecting coaxial cable. Series of Teflon-spaced stainless-steel concentric cylinders make up probe.

When probe is inserted in vessel or transfer line, presence or absence of liquid changes capacitance as liquid fills space between cylinders. Change is transmitted by coaxial cable through explosion-proof flexible conduit to transistorized amplifier, where it is converted to energize double-pole double-throw relay.

Amplifier, also housed in explosion-proof conduit box, has four computer-type transistors. Coupling and impedance matching is accomplished by iron-core transformers.

(Cryogenic liquid detectors are development of Missile Equipment Division, Minneapolis-Honeywell Regulator Co., Pottstown, Pa.)

Check 1155 opposite last page.

**Potentiometer offsets
ambient-temperature,
other variations**

Uses: Converts low-level DC signals to proportional 1- to 5-milliamper DC signals for transmission to distant measurement and control systems.

Features: Compensates automatically for variations in ambient temperatures, power supply, or line resistance.

Description: Transmitting potentiometer's semi-null-balance, resistance-bridge design responds sensitively and in-

Taylor Instruments MEAN ACCURACY FIRST

Check 1154 opposite last page.

stantly to input change.

Input is compared with measured portion of output signal by means of four-arm Wheatstone bridge circuit. Sensitive electro-mechanical balance detects unbalance between two signals, and oscillator amplifier transforms it into output signal.

Null adjustment is hair-spring loading the balance beam. Hairspring can be adjusted with screwdriver to provide either minimum or maximum output signal when input is interrupted, thus providing for thermocouple break.

Power is automatically shut off by disconnect switch before amplifier can be removed.

Unit is qualified for Class 1, Group D, Division 2 semi-hazardous service, and is available with either thermocouples or resistance bulbs for straight or differential temperature measurements.

(E710 series potentiometers are products of Manning, Maxwell & Moore, Stratford, Connecticut.)

Check 1156 opposite last page.

Analog to digital recorders that convert and record analog values in digital binary-decimal punched tape form while simultaneously providing digital values in electrical form for telemetering are described in eight-page Cat 35-1541 — Fischer & Porter Company, 151 Jacksonville Rd., Hatboro, Pennsylvania.

Check 1157 opposite last page.

KTIO, block insulation makes bench furnace more compact

Less power consumption, shorter heat-up time

Uses: Muffle-furnace applications in laboratory.

Features: Fibrous potassium titanate block insulation is used instead of firebrick. Power consumption is substantially reduced, as are weight and size.

Description: Insulation less than inch thick compares with 3 to 4" of firebrick in insulating properties. This allows greater capacity in small units.

Furnace heats from room to 1550°F in 15 minutes—to 1900°F in 24 minutes; and is designed for continuous operation at 1900°F, intermittently to 2100°F. In test, special muffle furnace required 580w to hold 1900°F, while standard muffle model consumed 1150w.

Standard equipment includes built-in pyrometer for direct reading of chamber temperature, input controller, and pilot light. It weighs 17 lb, and is available for 115 or 280v input.

(Hotpack bench furnace is product of The Electric Hotpack Company, Inc., Cottman Ave. at Melrose St., Philadelphia 35, Pa.)

Check 1158 opposite last page.

HOW TO METER Hard to Handle Liquids



Bottle washing plant of large brewery

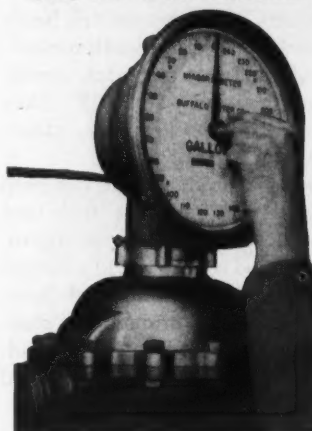
and do it Automatically

Set for 175 Gallons

That was the problem at a large brewery. The liquid was caustic soda. It had to be measured accurately and added to the water in the bottle-washing machine to remove labels and foreign matter.

The liquid caustic was stored in two large tanks. By piping the liquid through Niagara Electriccontact Meters, it was only necessary for the operator to set the meter dial hand to the desired number of gallons of caustic, then press a push button to start the delivery to the washing machine. Upon delivery of the preset quantity, the switch in the Electriccontact Meter closes a solenoid to stop the flow of caustic. Simple . . . accurate . . . and fool-proof!

Let us show you how to solve your liquid metering problem to give you cost-saving, time-saving accuracy by automation. Write for complete information.

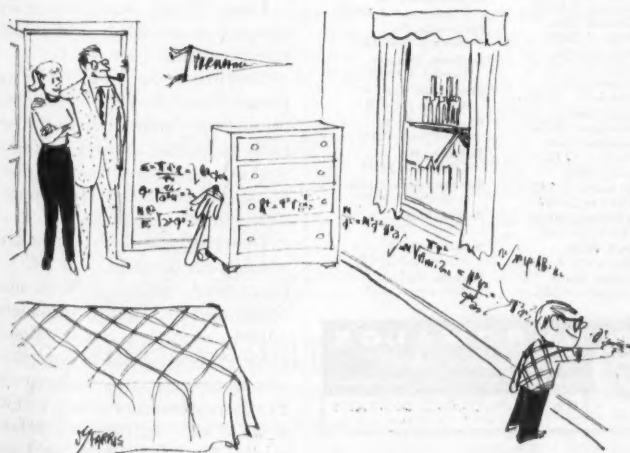


Get 175 Gallons

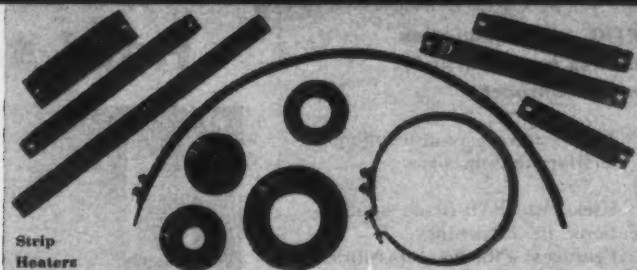
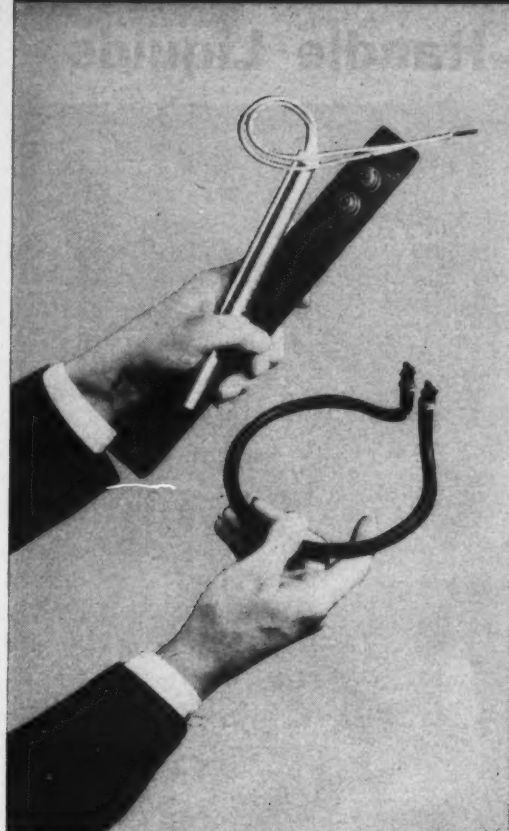
BUFFALO METER COMPANY, Incorporated

2892 MAIN STREET • BUFFALO 14, NEW YORK

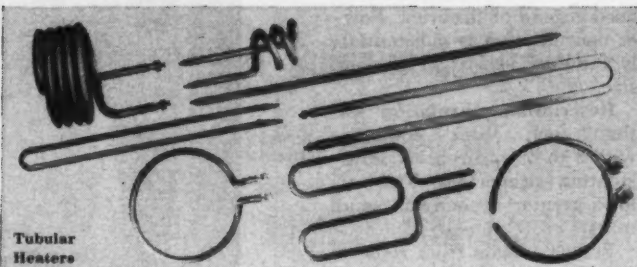
Check 1159 opposite last page.



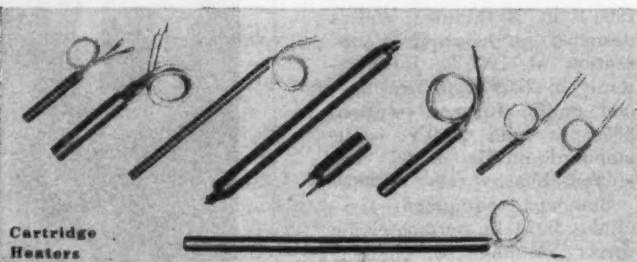
Call your CHROMALOX Man for the heating answers



Strip Heaters



Tubular Heaters



Cartridge Heaters

These 3 basic CHROMALOX heaters provide answers to just about any heating problem

Strip Heaters . . . that quickly and easily bolt or clamp to platens, dies, kettles, tanks, pipes, rolls, drums, ovens and air ducts. Lengths from 4 to 96 inches, widths from $\frac{3}{4}$ to $2\frac{1}{2}$ inches, with cross section curving or lengthwise bending. Available with brazed-on fins.

Tubular Heaters . . . that clamp on, fit into machined grooves, cast into metals, immerse in liquids, install in ovens and ducts. Straight lengths or factory-formed to nearly any contour. Lengths from 6 inches to 30 feet. Triangular or round cross section. Available with brazed-on fins.

Cartridge Heaters . . . that smoothly fit standard drilled holes in dies, platens, molds, extrusion and injection barrels. Special leads available for protection against flexing action, abrasion, moisture or vapors. Diameters from $\frac{3}{8}$ to $1\frac{1}{4}$ inches, lengths from $1\frac{1}{2}$ to $25\frac{1}{2}$ inches.

Versatile Chromalox electric heaters are available in sheath materials and wattages to match almost any application to 1100°F. Easy to install, they are fast, clean, safe and economical.

Your Chromalox Man can help you determine the one that best answers your specific problem. He's backed by the world's largest factory stock of industrial heaters, ready for immediate shipment. Why not give him a call. You'll find his phone number listed at the right.

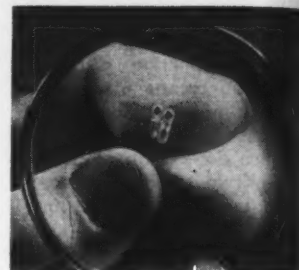
Our new Catalog 60 provides detailed product information and suggests numerous applications for the complete line of Chromalox electric heaters for industry. If you have not yet received a copy, please let us know.

Sales-Engineering Representatives

Atlanta, Ga. Trinity 5-7244	Indianapolis, Ind. MEIrose 5-5313
Bala-Cynwyd, Pa. MOhawk 4-6113	Kansas City, Mo. Victor 2-3306
Baltimore, Md. HOpekins 7-3280	Los Angeles, Calif. Richmond 7-5191
Binghamton, N. Y. RA 4-7703	Middletown, Conn. Diamond 6-9606
Bloomfield, N. J. Edison 8-6900	Milwaukee, Wis. Broadway 1-3021
Boston, Mass. Liberty 2-1941	Minneapolis, Minn. Federal 6-3373
Buffalo, N. Y. SUMmer 4000	Nashville, Tenn. CYpress 2-7016
Charlotte, N. C. EDison 4-4244 FRanklin 5-1044	New York City, N. Y. WOrth 4-2990
Chattanooga, Tenn. AMherst 5-3862	Omaha, Nebraska ATlantic 7600
Chicago, Ill. HARRison 7-5464	Philadelphia, Pa. GREENwood 3-4477
Cincinnati, Ohio TRinity 1-0605	Pittsburgh, Pa. EMerson 1-2900
Clearwater, Fla. Phone 3-7706	Portland, Oregon Capitol 3-4197
Cleveland, Ohio PROspect 1-7112	Richmond, Va. ATlantic 8-8758
Dallas, Texas Riverside 1-9004	Rochester, N. Y. HAMilton 6-2070
Dayton, Ohio Phone 6-5233	St. Louis, Mo. CHestnut 1-2433
Denver, Colo. GLEndale 5-3651 GEnerse 3-0821	San Francisco, Calif. UNDERhill 1-3527
Des Moines, Iowa CHerry 3-1203	Seattle, Wash. MAIn 4-7297
Detroit, Mich. UNiversity 3-9100	Syracuse, N. Y. HOWard 3-2748
Houston, Texas Capitol 5-0356	Wichita, Kansas AMherst 2-5647



INSTRUMENTS & LAB



Individual calibration

. . . of thermistor probes is no longer needed with development of probes having identical resistance-temperature characteristics. Repair, replacement, and stocking are simplified by development.

Two standard probes in production now feature absolute resistance calibrated in 1°F increments from 0 to 350°F. Sensitivity is indicated by resistance changes from 26,520 ohms at 0°F to 70.4 ohms at 350°F.

Any quantity of probes is within 2% of the resistance at any point in temperature range.

(Matched thermistor probes are development of Fenwal Electronics, Inc., 51 Mellen St., Framingham, Mass.)

Check 1161 opposite last page.

Self-shielding device protects instruments from magnetic field

Models for panel mounting available for AC and DC

Uses: Panel instruments for mounting to ASA C39.1-1955 specifications.

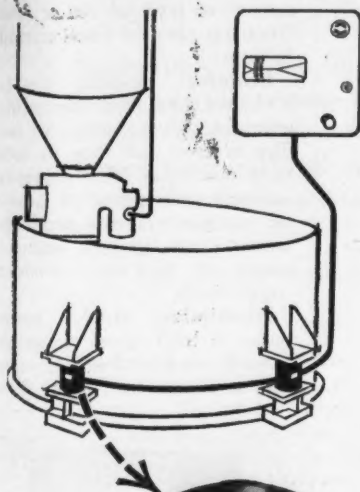
Features: Self-shielding mechanism permits instrument mounting near magnetic or non-magnetic panels without special adjustments, by protecting them from stray magnetic fields.

Description: Two types are available: Model 1751 DC—ammeters, milliammeters, microammeters, and voltmeters (1000 ohms/v); and Model 1752 AC—milliammeters, microammeters, and voltmeters. Former offers accuracy within $\pm 2\%$ of full-scale value; while Model 1752 is accurate

Check 1160 opposite last page.

MEASURING QUANTITY?

Then do it the modern way
...with accurate, rugged,
trouble-free SR-4® Load Cells



Weigh or control chemicals faster and more accurately—yet with maximum simplicity—with B-L-H SR-4®

Load Cells. Installed as part of the tank support structure, no part of the measuring system comes in contact with the contents of the tank. Can be installed on tanks already in use. Output suitable for use with local or remote indicator, recorder or automatic dispensing control. Explosion-proof. Hermetically sealed—unaffected by dust, grease or moisture; long service life assured. Available in standard capacities of 50 through 200,000 lb., accuracies to $\pm 0.10\%$.

For more information on load cells and complete batching systems, write Dept. 16-J, and ask for Bulletins 4355 and 4510

FIRST in force measurement



BALDWIN-LIMA-HAMILTON

Electronics & Instrumentation Division
Waltham, Mass.

SR-4® Strain Gages • Transducers • Testing Machines

Check 1162 opposite last page.

OCTOBER 1959

INSTRUMENTS & LAB

within $\pm 3\%$ of full scale when used on sine wave 60-cycle source at 25°C.

DC instruments have range from 50 microamperes through 20 amperes (self-contained), beyond which external shunts are provided. AC instruments range from 200 microamperes through 5 milliamperes and up to 300 volts self-contained. Units measure $4\frac{1}{2} \times 4\frac{1}{2} \times 1\frac{3}{4}$ ".

(Further information on Models 1751 DC and 1752 AC may be obtained from Daystrom-Weston Sales Division, Weston Instrument Division, Daystrom, Incorporated, 614 Frelinghuysen Ave., Newark 12, New Jersey.)

Check 1163 opposite last page.

Up to 10 pilots operated by time-cycle control

Uses: Multi-variable time control for such applications as operation of tire presses, dyeing, water conditioning, and batch processes.

Features: Can operate up to 10 pilots—pneumatic, electric, or combination—simultaneously or in sequence. Each pilot can perform up to 24 operations.

Description: Timing of pilot operations is determined by dogs set on periphery of timing disc. Intervals between operations can be as brief as four seconds. Timing discs range from 0-15 to 0-360 minutes.

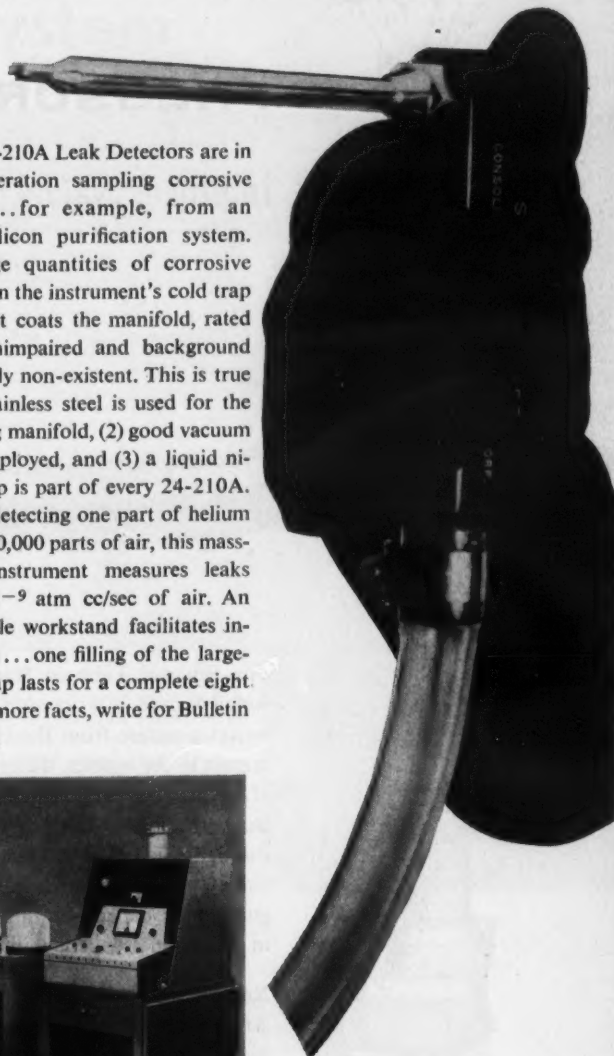
Basic model can be varied with standard pneumatic pilots, high-capacity pneumatic pilots, and SPDT, DPDT and special-purpose switches.

(Model CIC500 time-cycle controller is development of The Bristol Company, Waterbury 20, Conn.)

Check 1164 opposite last page.

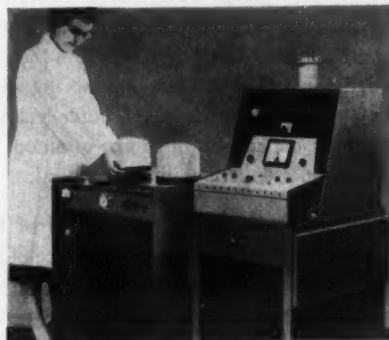
Fast-neutron spectrometer which uses double-pulse, total-absorption technique is described in 27-page National Bureau of Standards Technical Note 1. Copies, at 75c each, may be ordered from Office of Technical Services, Department of Commerce, Washington 25, District of Columbia.

NOW...CONTINUOUS LEAK TESTING IN CORROSIVE ATMOSPHERES



Today CEC 24-210A Leak Detectors are in continuous operation sampling corrosive atmospheres...for example, from an iodide-type silicon purification system. Although large quantities of corrosive iodine collect on the instrument's cold trap and silicon dust coats the manifold, rated accuracy is unimpaired and background remains virtually non-existent. This is true because (1) stainless steel is used for the sample carrying manifold, (2) good vacuum geometry is employed, and (3) a liquid nitrogen cold trap is part of every 24-210A.

Capable of detecting one part of helium tracer gas in 300,000 parts of air, this mass-spectrometer instrument measures leaks as small as 10^{-9} atm cc/sec of air. An accessory mobile workstand facilitates in-plant operation...one filling of the large-volume cold trap lasts for a complete eight hour shift. For more facts, write for Bulletin CEC-1830-X41.



AUXILIARY TEST STATIONS... PSM 102 & 202 may be used with all CEC Leak Detectors for hooding, probing, and inside-out leak testing techniques. PSM 102 is a semi-automatic or manual unit. PSM 202 is fully automatic. Write for Bulletin CEC 4-62.

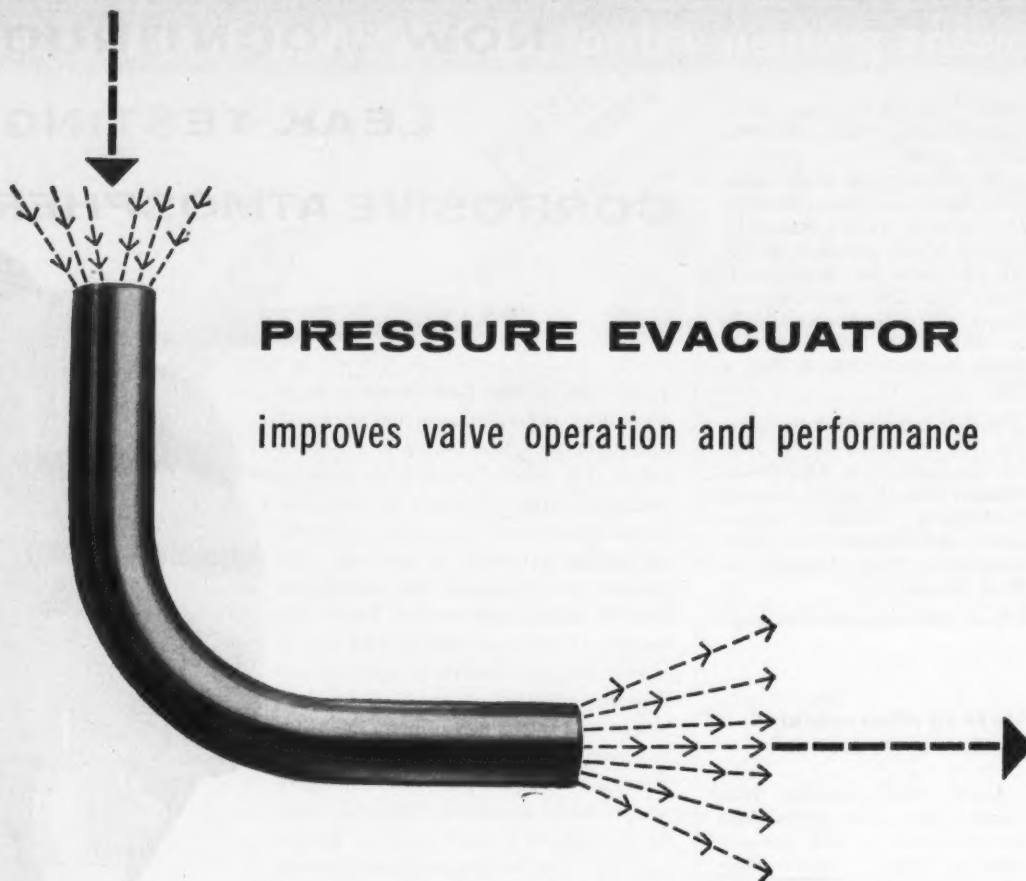
Analytical & Control Instrument Division

CEC

CONSOLIDATED ELECTRODYNAMICS / 360 sierra madre villa, pasadena, california

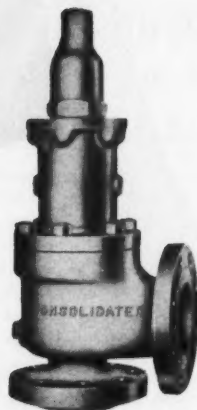
FOR EMPLOYMENT OPPORTUNITIES WITH THIS PROGRESSIVE COMPANY, WRITE DIRECTOR OF PERSONNEL

Check 1165 opposite last page.



PRESSURE EVACUATOR

improves valve operation and performance



Consolidated Safety Relief Valve, Type 1900 Series, Sizes: 1" x 2" to 8" x 10".

The Eductor Tube in Standard Consolidated Safety Relief Valves is a pressure evacuator. It efficiently removes pressure from the closed bonnet. If allowed to remain in the bonnet, the pressure would act on the top of the disc and tend to limit the lift and induce cycling. But with the pressure evacuated from the closed bonnet through the Eductor Tube, the spring alone controls valve action. Consequently, *reliable* valve action and guaranteed capacity ratings are attained. A new high in operational dependability is assured.

Reliable operation and performance of Consolidated Safety Relief Valves are your assurance of absolute protection for personnel and equipment. "2 in 1" design permits you to convert the Standard valve to the Belows type in your own shop. But that is only part of the total economy of these modern valves. Get the complete inside story. Write for Catalog 1900.



CONSOLIDATED SAFETY RELIEF VALVES

A product of

MANNING, MAXWELL & MOORE, INC.

Consolidated Ashcroft Hancock Division • Tulsa, Oklahoma

In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

Check 1166 opposite last page.

INSTRUMENTS & LAB

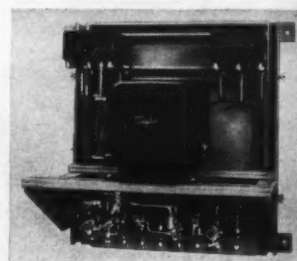
Fast measuring, control of internal reflux flow in fractionating column

External reflux flow rate is affected little

Uses: Measurement and control of internal reflux flow from top plate of fractionating column.

Features: Properly calibrated installed computer eliminates disturbances in reflux system, and thus in column operation. This prevents excessive carryover of heavier components into products stream and assures maintenance of necessary product composition.

Description: Analog computer in high-speed operation permits ample time for correction of external reflux flow



Computer control eliminates disturbances in reflux system and thus in fractionating column

rate before effects of change in internal reflux flow rate become significant.

Peripheral measurements coupled with predetermined mathematical computations bring about accurate internal reflux flow rate measurement and control.

(Internal-reflux computer control is product of Taylor Instrument Companies, 95 Ames St., Rochester 1, N.Y.)

Check 1167 opposite last page.

Punch tape reader is explained in two-page data sheet which shows how, when model is used in combination with a general purpose digital computer, it accepts paper tapes punched in any numeric code. AS-049 — Bendix Computer, Div. of Bendix Aviation Corporation, 5630 Arbor Vitae St., Los Angeles 45, Calif.

Check 1168 opposite last page.

No Maintenance in Four Years With Zinc-vinyl Coating System

Combination of zinc silicate coating as base, followed by a vinyl primer and then two vinyl topcoats in color, has been found to be outstanding for protecting structural steel in chemical plants subjected to severe atmospheric conditions

GORDON WEYERMULLER, Associate Editor

Problem: Location of Union Carbide Chemicals Co. plant at Torrance, California, where polyethylene and ethylene oxide are manufactured, made it a difficult one to protect from corrosion.

Plant is about a mile or so from the ocean. Since prevailing winds are from the west, area is subjected to salt air. Plant also must withstand the intense sunlight of area. In the evening the humidity often rapidly increases. In addition, Union Carbide's own cooling towers subject surrounding steel to a constant moisture condition.

Solution: When plant was being designed, Carbide's Engineering Department at South Charleston, W. Va., decided to sandblast and coat all structural steel in critical areas with an inorganic zinc silicate coating known as Dimetecote. Then after all steel was in place, a vinyl primer, Amercoat No. 86, would be applied.

In last step, two coats of a vinyl topcoat, Amercoat No. 33, would be used. Coating system was also applied to uninsulated pipe and processing equipment.

Zinc Coating

Inorganic zinc silicate coating is cured by washing with a chemical curing solution. Coating is hard and abrasion-resistant and will protect steel in most environments without

overcoating. However, because of acidic conditions around this plant, the chemical-resistant vinyls were used as topcoats. Also, since zinc coating is available only in a gray finish, use of vinyls permitted a variety of colors.

Vinyl Coatings

Vinyl coatings are made from vinyl chloride and vinyl chloride copolymers. Solvents usually consist of ketones. Diluents are aromatic hydrocarbons.

Flexibility of coatings is increased by addition of plasticizers of softening agents. Di-2-ethyl hexyl phthalate and tricresyl phosphate can be used. Most common pigments can be used with the vinyl resin coatings.

Pigmented vinyl finishes resemble nitrocellulose lacquers in both formulation and preparation. Use of pigments of maximum hiding power keeps volume ratio of pigment to resin low enough to prevent too great a change in physical properties of film. Fillers and extenders are not generally used.

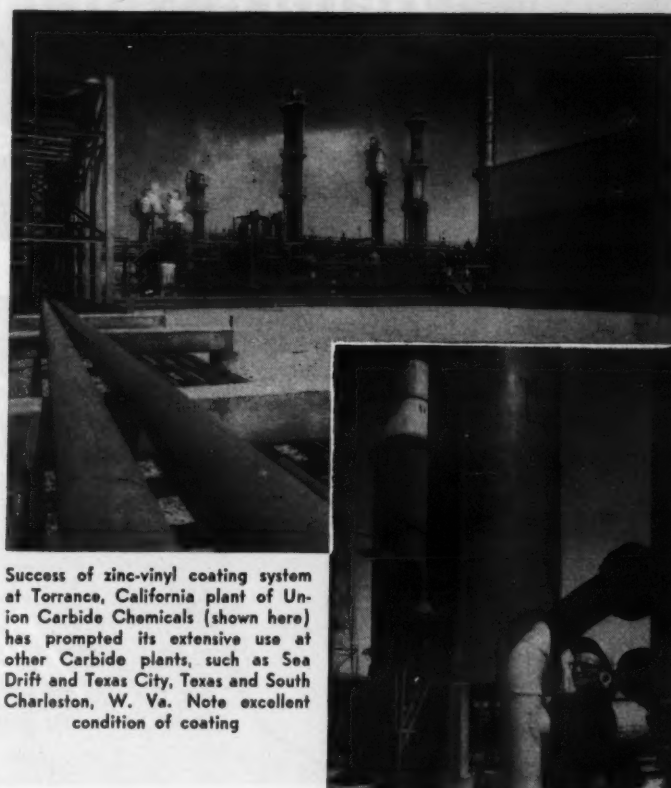
Part of the steel used at the Torrance plant was coated with the zinc coating at the steel supplier's plant and part at the job site. Transporting, handling, and erecting the steel caused less than 5% damage to the zinc coating.

Although some sub-assemblies were riveted or welded,

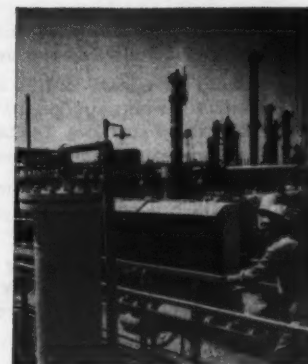
most of steel was erected and fastened with high-strength bolts. Specifications for this type of construction usually require that bearing surfaces not be painted. This is necessary to maintain proper frictional contact. However, in this case, the zinc coating actually increases coefficient of friction and, in addition, prevents corrosion on bearing surfaces.

It was more than a year after zinc coating was applied before vinyl topcoats were applied. Because there are some alkaline salts of zinc present on surface of base coating, it is desirable to use a primer not affected by alkalis. The No. 86 coating used is such a ma-

To page 108



Success of zinc-vinyl coating system at Torrance, California plant of Union Carbide Chemicals (shown here) has prompted its extensive use at other Carbide plants, such as Sea Drift and Texas City, Texas and South Charleston, W. Va. Note excellent condition of coating



Zinc-vinyl coating system, which has already withstood severe conditions for four years without maintenance, is expected to last two more years before major recoating is necessary

Before you buy any
Coal Tar-Epoxy Resin Coating
(even **TARSET**)

*Check
these
points!*

- ✓ A good coal tar-epoxy coating, applied to a minimum thickness of 16 mils and cured for three days, should not lose *any* adhesion when immersed in salt or fresh water. **TARSET** maintains a tight bond under water.
- ✓ A good coal tar-epoxy coating should not slip or curtain when applied 10 to 15 mils thick to vertical surfaces. **TARSET** does not slip when applied to 15 mil thickness.
- ✓ A good coal tar-epoxy coating should maintain its full effectiveness in storage. **Tarset** has excellent shelf life.
- ✓ A good coal tar-epoxy coating should be known by its performance. **TARSET** has an unequalled five-year record of outstanding performance.

No other coal tar-epoxy resin coating on the market duplicates the exclusive Pitt Chem **TARSET** formula. It has not been made available to anyone else! Only **TARSET** is backed by a five year record of outstanding performance in the field. Call your Industrial Distributor for more information . . . today! See the "Yellow Pages."

11-011



Regional Offices:
Glendale, Calif., Houston,
Summit, Ill., New York City

PROTECTIVE COATINGS • COAL CHEMICALS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON • FERROMANGANESE

Check 1169 opposite last page.

CORROSION CONTROL

Use detachable filter separate from pump

Uses: Pumping and filtering corrosive solutions.

Features: Filter chamber is detachable from sump pump, so pump may be rotated from filter to filter in series of tanks, or vice versa.

Description: Special supporting-bracket assemblies enable filter or pump to be easily attached to or detached from tank flange top.

Sump pump is fabricated from high-temperature epoxy resins; shaft is available in stainless 316, Hastelloy C, or titanium. Filter chambers are of high-temperature Lucite or epoxy, PVC, or Teflon.

Filter tubes of cotton or Dynel provide depth filtration down to 1m μ . Pumps are available in 3/8 and 1/2" sizes which deliver 900 to 1500 gph and develop 25 psi before shutoff.

(Sump filter pump is product of Sethco Manufacturing Corp., 2284 Babylon Turnpike, Merrick, N.Y.)

Check 1170 opposite last page.

Inorganic zinc coating dries in 20 minutes after application

Uses: Provides galvanic protection to steel and eliminates sub-film rusting in salt water, fresh water, and solvent environment.

Features: Coating, applied by brush, spray, or roller, becomes water-insoluble after 20 minutes.

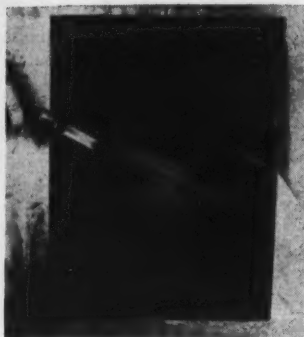
Description: Inorganic zinc coating, effective from -80° to +750°F, provides a conductive zinc film when applied. When immersed, reactive metal slowly goes into solution as needed to afford direct galvanic protection to steel surfaces.

Quick water-insolubility characteristic permits painting in 90-100% relative humidities, and at temperatures as low as -20°F.

Coating is a byproduct of research on high-temperature coatings for satellites and missiles which developed a

CHEMICAL PROCESSING

vehicle having an Si-O-Si chain. While coating resulting from this vehicle was too permeable for use on steel where drop in temperature below dew point would permit condensation to occur and resultant rusting, efforts to incorporate magnesium, aluminum and zinc powders into vehicle and thus provide



Water is being sprayed on panel painted 20 minutes earlier with inorganic zinc coating, as demonstration of water-insolubility characteristic

cathodic protection led to the inorganic zinc coating.

Coupled to steel in fresh water, coating has potential of 0.4 to 0.5v; in brine or salt water, 0.55 to 0.60v. Maximum theoretical potential would be 0.72v.

Bonding well to blasted steel, degreased cold-rolled steel, and wire-brushed rusty metal, coating is fairly hard within hour after drying, but hardness increases for period of seven to 10 days.

(Carbo Zinc 11 coating is development of The Carboline Company, 32 Hanley Industrial Ct., St. Louis 17, Mo.)

Check 1171 opposite last page.

Duct fans fabricated with glass-fiber material are introduced in Bul A-116—Hartzell Propeller Fan Company, Division of Castle Hills Corp., Piqua, Ohio.

Check 1172 opposite last page.

Gate valves, designed specifically for ductile iron, are tabulated in eight-page brochure, Form 1010—The Ohio Injector Company, Wadsworth, Ohio.

Check 1173 opposite last page.

Designed for performance Lined for permanence



*with Fluoroflex-T[®]
...Teflon[®] at its best*

UNIVERSALLY INERT, CORROSION-PROOF pipe and fittings are ideal for service to 500°F with virtually all known chemical and corrosive solutions. Liners are of Fluoroflex-T... a special, high density, non-porous compound of Teflon.

NON-CONTAMINATING Fluoroflex-T liner is formed over the gasket face of the flange—eliminates any contact between the materials being handled and the metal housing.

STREAMLINED—Smooth contours and seamless liner of Fluoroflex-T in all fittings mean a minimum of turbulence and back pressure.

SPACE-SAVING—ASA short radius housings keep pipe runs compact, give tight turns in close quarters.

ECONOMICAL—Chemically inert liner and strong ductile iron housings give *permanent* fitting life—eliminate maintenance and replacement costs.

USEFUL IN ANY STANDARD SYSTEM—Fittings are compatible with any flanged metal, ceramic, plastic or lined piping system in current use.

SEND FOR DATA on Fluoroflex-TS pipe and fittings for complete piping systems. Write for further information to Dept. 405, RESISTOFLEX CORPORATION, Roseland, N. J. Other Plants: Burbank, Calif.; Dallas, Tex.

*Fluoroflex is a Resistoflex trademark, reg., U.S. pat. off.
*Teflon is DuPont's trademark for TFE fluorocarbon resins

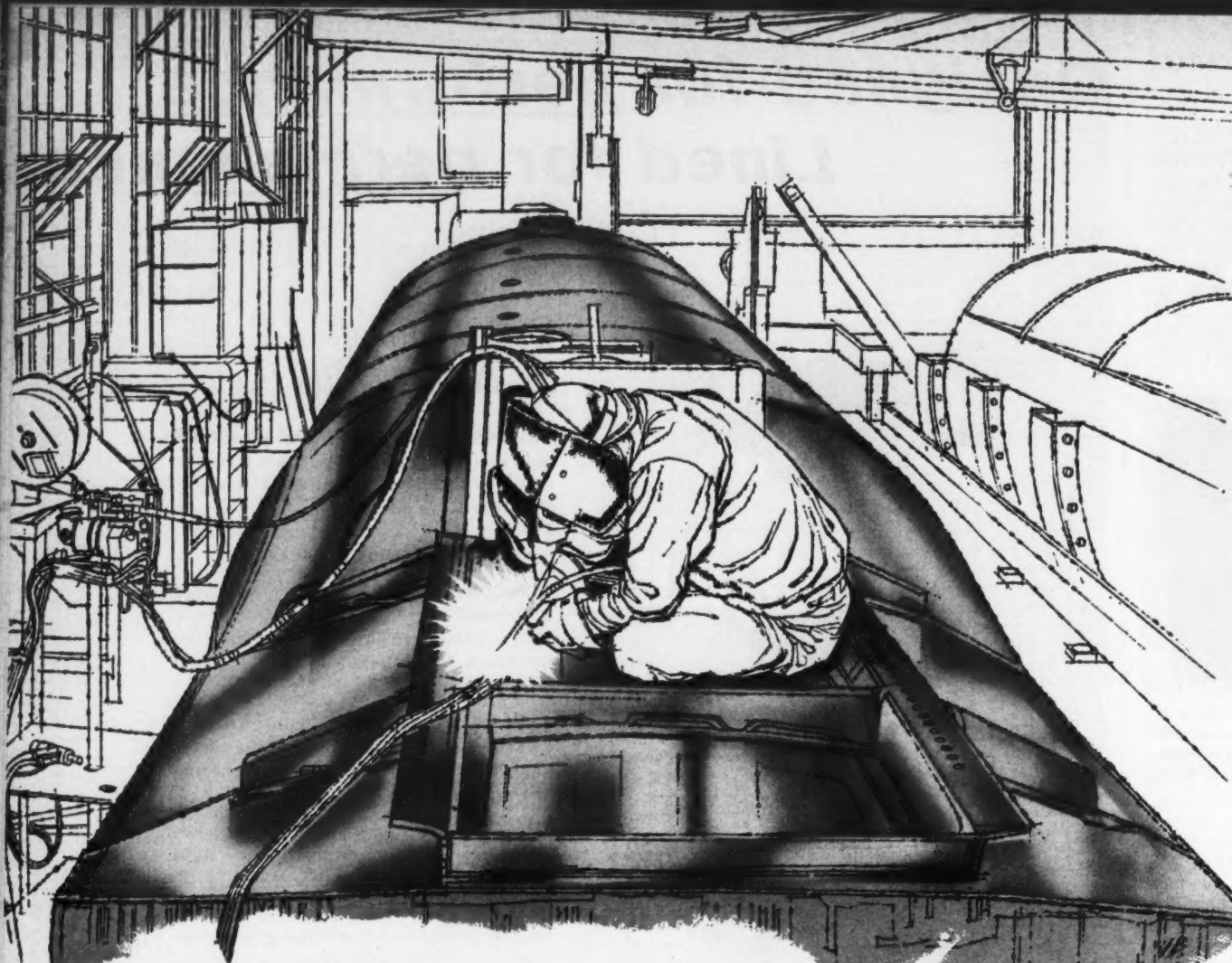
RESISTOFLEX

Complete systems for corrosive service



LINED STEEL PIPE • FLANGED FLEXIBLE HOSE • BELLOWS • ELBOWS • TEES • REDUCERS • DIP PIPES & SPARGERS • LAMINATED PIPE

Check 1174 opposite last page.



Formula for Success

The formulation of a stainless steel alloy requires as much precision as any chemical compound. All the care exercised in the selection of a particular alloy can be nullified by variations in the analysis specified.

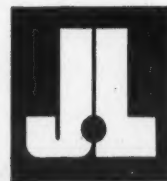
During fabrication, for example, slight differences in chromium-nickel: carbon ratios can cause changes in microstructure which lead to early failure.

That's why it is safer to specify J&L Consistent Quality Stainless Steel. J&L leads the industry in melt shop standards for stainless steel—the point where quality starts, and longer service life begins.



Plants and Service Centers:

Los Angeles • Kenilworth (N. J.) • Youngstown • Louisville (Ohio) • Indianapolis • Detroit



STAINLESS

SHEET • STRIP • BAR • WIRE



Moved Recently?

If you have, you will want to make sure that your copy of **CHEMICAL PROCESSING** will continue to come to you on time.

Maybe...

you have received a promotion and have been transferred to a new location.

Or, if you have changed your affiliation, we want to make sure that your copies of **CHEMICAL PROCESSING** will follow you.

Fill out...

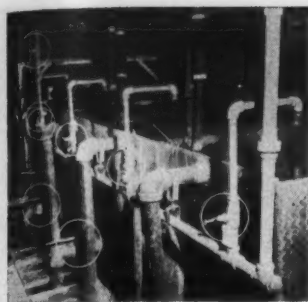
the slip opposite the back cover. Be sure to answer all questions regarding your new location, title, and company.

In addition, give us your former address, including company, city, state.

Mail this slip to the Reader Service Department and we will make sure you will continue to receive each issue of the magazine promptly.

For more information on product at left, specify 1175 see information request blank opposite last page.





Plastic ball valves

...do not show appreciable signs of corrosion or leakage after more than four months use in controlling recirculation and drainage of highly corrosive acids in nickel-plating bath.

Polyvinyl chloride valves were installed at Independent Plating Company operation, Worcester, Mass., to solve corrosion problem.

(PVC Double-Seal ball valves are produced by Jamesbury Corp., 45 New St., Worcester 5, Mass.)

Check 1176 opposite last page.

Nozzles of hard rubber to spray corrosives

Uses: Atomizing nozzles for corrosive-liquid spraying applications.

Features: Fabricated completely of hard rubber.

Description: Capacities offered range from a gallon per hour to 26 gallons per hour at 40 psi. They produce hollow cone spray pattern with atomization accomplished through hydraulic pressure alone.

(1/4-NR atomizing nozzles are manufactured by Spraying Systems Company, 3216 Randolph St., Bellwood, Ill.)

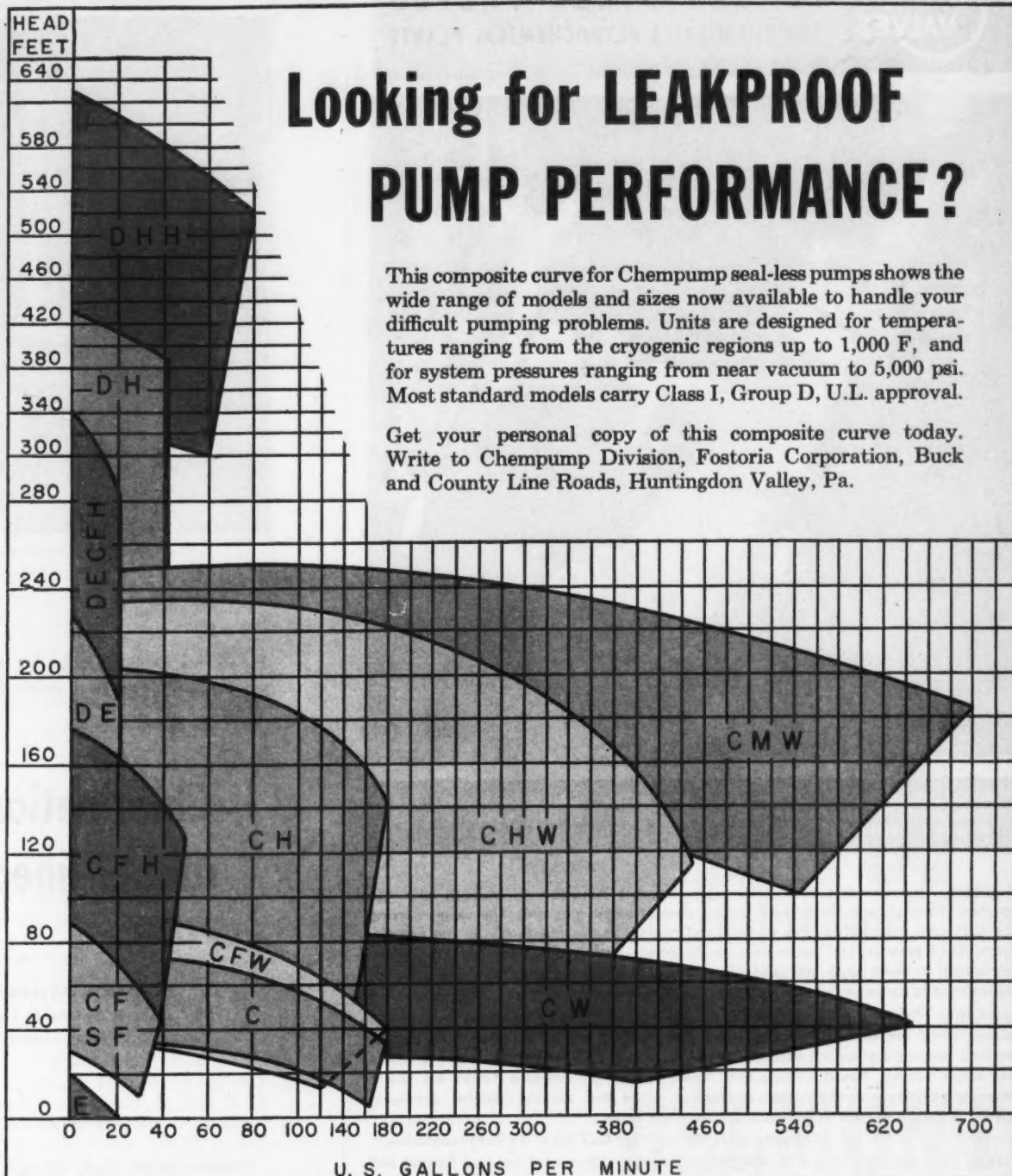
Check 1177 opposite last page.

Flame spraying of metals and ceramics is treated in detail in 345-page book which contains more than 150 diagrams, photos, and charts. Reference uses include corrosion control, product design, material engineering, and machine maintenance. Metallizing Handbook is available for \$5 postpaid from Metallizing Engineering Co., Inc., 1101 Prospect Ave., Westbury, L.I., N.Y.

Looking for LEAKPROOF PUMP PERFORMANCE?

This composite curve for Chempump seal-less pumps shows the wide range of models and sizes now available to handle your difficult pumping problems. Units are designed for temperatures ranging from the cryogenic regions up to 1,000 F, and for system pressures ranging from near vacuum to 5,000 psi. Most standard models carry Class I, Group D, U.L. approval.

Get your personal copy of this composite curve today. Write to Chempump Division, Fostoria Corporation, Buck and County Line Roads, Huntingdon Valley, Pa.



This composite curve is intended to show relative head-capacity performance of Chempump seal-less pumps. It is to be used as a guide to specific model performance curves, available on request. All units are single stage except those with "D" in model designation which are two-stage pumps. Curves are based on 60-cycle operation.

COMPOSITE CURVE

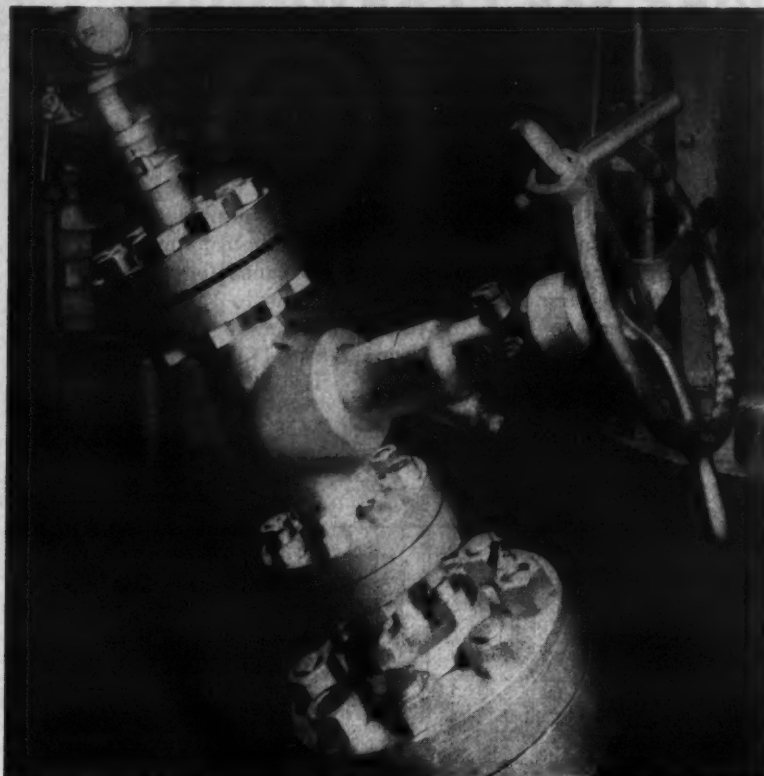
C H E M P U M P

DIVISION • FOSTORIA CORPORATION
HUNTINGDON VALLEY, PENNSYLVANIA

Check 1178 opposite last page.



FORGED STEEL VALVES
FOR CHEMICAL & PETROCHEMICAL PLANTS



ORBIT VALVE shown in above picture is in service on Autoclave Process, Dye Department, Tennessee Eastman Company, Division of Eastman Kodak Company, Kingsport, Tennessee.

PROBLEM: Because this is a batch operation, the Autoclave is charged with the reactant materials and these materials are cooked under pressure. The valves serving the Autoclave must be positive shut-off and contain the reactants during the cooking cycle. Since pressure and temperatures are involved in this process and since the valves are worked for each batch, the service is rugged and requires a good valve. In addition, the catalyst is carried in suspension and is part of a slurry type mix.

SUMMARY: Exacting valve performance is required for service shown and described above. There can be no valve stem leaks. Orbit Valves feature a pliable plastic stem packing utilizing a shredded base of 'Teflon' as a major ingredient; each tiny shred is like a coil spring. Result: These tiny, coiled springs of shredded Teflon are like a reservoir of energy—exerting reserve pressure in the stem packing chamber. Economic result: A very minimum of attention and no stem leaks.

*Registered trademark for DuPont's "TFE-Fluorocarbon".

SIZES: 1", 1½", 2½", 3" and 4" ASA 300-lb. through 2500-lb., full opening flanged and screwed ends. Venturi opening available in sizes: 2", 2½", 3", 4" and 6" ASA 150-lb. through 2500-lb. flanged ends only.

SOURCE: Through your favorite industrial supply house.

LITERATURE: Write Department B for Catalog 58-B.

ORBIT VALVE COMPANY

P. O. BOX 699, TULSA, OKLAHOMA
Phone LUther 4-4761, TWX TU 925

Check 1179 opposite last page.

CORROSION CONTROL



Fig 1 — Rubber-lined equipment for chlorination mixing process

Experience in bleach plant for soda-process wood-pulping operation shows that —

Chlorination can't hurt rubber-lined equipment

GORDON WEYERMULLER, Associate Editor
with **P. E. FULLER**, Corporate Engineering Dept.
The Mead Corporation, Chillicothe, Ohio

Rubber-lined pipe, fittings, valves, and pumps have been in continuous operation since 1947 in a bleaching plant at The Mead Corporation without requiring replacement.

Installation is in a bleach plant for a soda-process wood-pulping operation for a paper mill. Plant is a three-stage bleaching operation using chlorination, caustic extraction, and calcium hypo-

chlorite. Design capacity is 60 tons AD pulp per day.

Rubber-lined equipment shown in photographs is used in the first or chlorination stage. Steel pipe is used in the caustic extraction stage and Transite pipe in the hypochlorite stage. Three percent chlorine is added on pulp basis. Consistency of pulp is 3½% and temperature 90°F.

Fig 1 shows the major

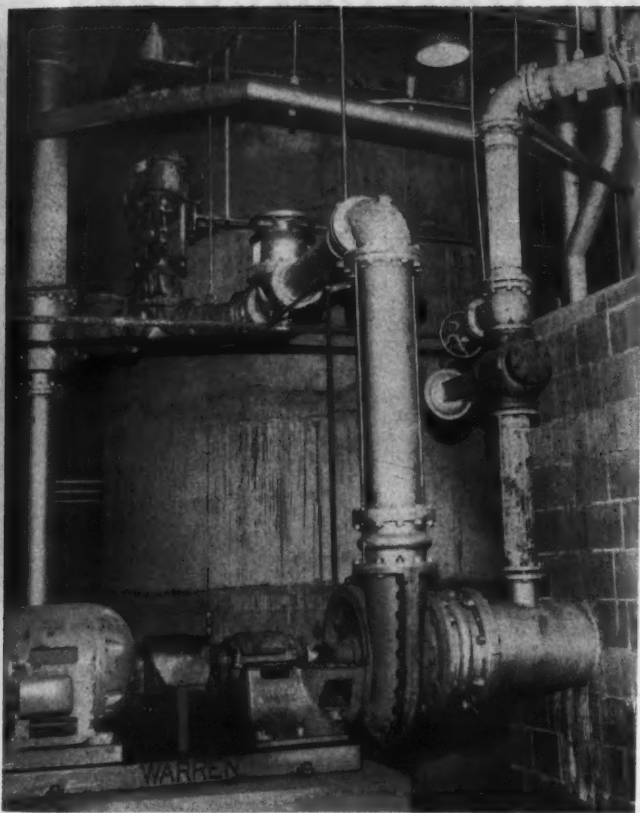


Fig 2—Rubber-lined equipment for dilution system of chlorination washer

equipment for the chlorination mixing process. The 16" vertical rubber-lined pipe shown at the right has a downward flow from the brown-stock (unbleached) consistency regulator and stock meter. It then flows through rubber-lined pump shown at right and is then pumped through rubber-lined chlorine mixer, shown in the center of the photograph, into the bottom of concrete, tile-lined chlorination tower in background.

The chlorinated stock then overflows into a lauder ring at top of tower, through the 16" rubber-lined pipe shown in center of photograph, and is then pumped through rubber-lined pump and pipe at left. All piping shown in Fig 1 is rubber lined except 2" pipe in center of photograph. This 2" pipe, which handles chlorine gas, is PVC.

Fig 2 shows dilution system for chlorination washer. Chlorinated stock of 3½% consistency flows upward through rubber-lined pipe at left from rubber-lined pump.

This stock must be diluted to 1.0% consistency before entering chlorination stage washer. For this reason, filtrate from chlorination washer enters tile water-leg box shown at right in Fig 2. A sufficient amount is pumped through rubber-lined pump and piping to satisfy requirements.

All piping shown in Fig 2 is rubber lined except 6" fresh-water-makeup line into pump suction, and floor drain piping.

(Rubber-lined pipe is product of Manhattan Rubber Div., Raybestos-Manhattan, Inc., Passaic, N. J.)

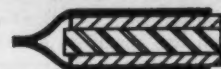
Check 1180 opposite last page.

**MOST
COMPLETE LINE**

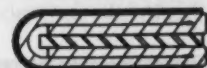
Eleven Product Groups
Serve Every Sealing Need

GROUP No. 8

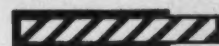
GASKETS



Envelope Ring Type



Molded Type

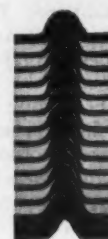
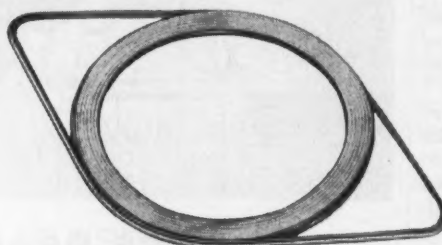


Machined Type

Chemically Impervious TEFLON*

Belmont Teflon Jacketed Gaskets offer special filler materials and inserts which meet specific installation and operating needs with respect to compressibility, resilience and rigidity.

Hence, they protect special chemical piping and equipment against excessive bolt loading while insuring perfect seals between metal, glass, glass-lined, Karbate, Haveg, porcelain, etc.



BELMONT Spiral Wound

Belmont Spiral Wound are gaskets with resilience "built in" for positive sealing action under the toughest service conditions.

Depending upon service, metal is either plated low-carbon steel or stainless. Filler materials are white or blue asbestos, or Teflon.

The Belmont Packing and Rubber Company • Butler & Sepviva Streets, Phila. 37, Pa.

*du Pont Trademark

BELMONT

**MOST
CONVENIENTLY AVAILABLE**

Nationwide Industrial
Distributor Organization
Provides On-the-Spot Service

1. High Pressure Asbestos Packings
2. Valve Stem Packings
3. Rotary Pump Packings & Seals
4. Crisscross Braided Packings
5. Hydraulic Packings
6. Bel-Vee V-Rings
7. Sheet Packings
9. Metallic Packings
10. Plastic Packings
11. Expansion Joints

Check 1181 opposite last page.

CORROSION CONTROL

Zinc-Vinyl Coating

From page 101

terial. Primer has good adhesion.

Two coats of No. 33 vinyl were then applied in desired color for a total minimum thickness of five mils. Most of material was sprayed although some was brushed on.

Results: Zinc-vinyl coating system has required absolutely no maintenance during the four years it has been in service, despite the severely cor-



Storage tanks coated with zinc-vinyl system

rosive conditions. It is expected to last two more years or longer before major recoating is necessary.

Success of coating system at Torrance has prompted its extensive use at other Carbide plants, such as Sea Drift and Texas City, Texas and South Charleston, W. Va.

(Dimetecote, No. 86 vinyl, and No. 33 vinyl coatings are products of Amercoat Corporation, 4809 Firestone Blvd., South Gate, Calif.)

Check 1182 opposite last page.

(Vinyl resins used in coatings are products of Union Carbide Plastics Co., Div. of Union Carbide Corp., 420 Lexington Ave., New York 17, N. Y.)

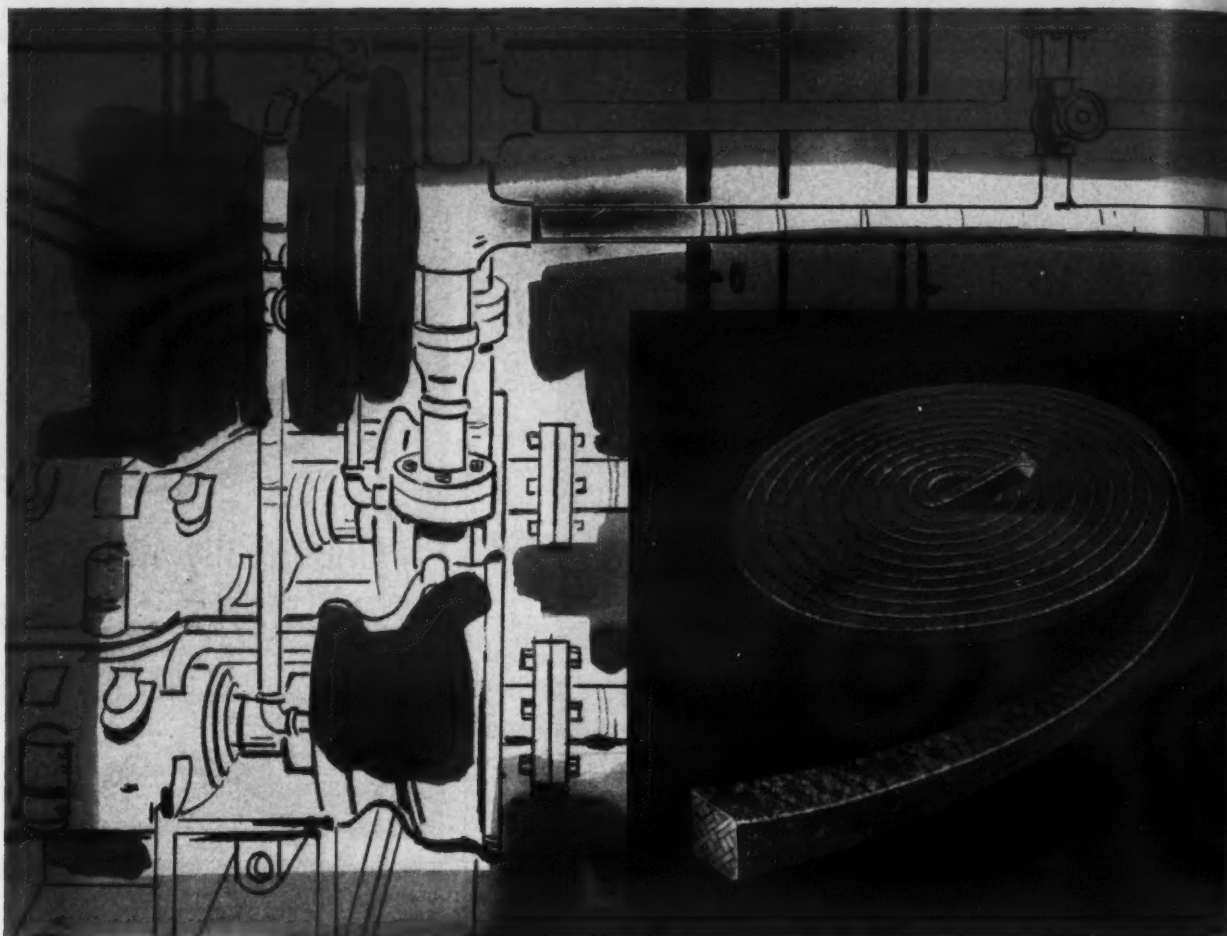
Check 1183 opposite last page.

Increase life of valves with plastic coating

Uses: Plastic coating extends application range in handling neutral salt solutions, alkalis, mild acids, and other services where iron contamination is problem.

Features: Coating increases

What Garlock Salesmen tell



"LATTICE-BRAID"® TEFLON† PACKING IS YOUR BEST BET FOR PUMPS AND ENGINES"

"LATTICE-BRAID TEFLON is just about perfect against chemicals—it's a strong, long-lasting, chemically-inert packing that reduces maintenance and downtime. Let me show you what I mean.

"With LATTICE-BRAID packing, each strand passes diagonally through the body of the packing at a 45° angle. This through-and-through braiding makes a completely unified structure of *greater strength*. Ordinary braided packings become worthless once the single outer cover is worn through. On LATTICE-BRAID, there is no single outer cover; thus, the braiding holds together far beyond the limits of other packings. This, obviously, results in *longer life*.

"On top of this, you have the advantage of TEFLON. It is completely unaffected by the strongest acids, solvents, and alkalis. Co-efficient of friction is extremely low, and it will withstand temperatures ranging from -90° F to +500° F.

"One customer repacked every two weeks on a solvent recovery pump application. He changed to LATTICE-BRAID TEFLON over two years ago and hasn't repacked since."

Garlock can furnish you with LATTICE-BRAID packing in a variety of sizes and styles depending on what you need. If you have a particular problem, call our sales office in your area. Or, you can write for further information. Ask for Catalog AD-131.

*Registered Trademark
†DuPont Trademark

GARLOCK

Packings, Gaskets, Oil Seals, Mechanical Seals,
Molded and Extruded Rubber, Plastic Products

Chemical Processing Customers

CORROSION CONTROL



Plastic coatings improve corrosion resistance of eccentric valves

life of iron valves with only slight price increase, says manufacturer.

Description: Eccentric valves are offered with choice of two coatings which may be applied on outside as well as inside. PC-1 coating is thermosetting tripolymer resin, while PC-3 has combination of chlorosulfonated polyethylene polymers with Hypalon base.

PC-1 valves, available in 1 to 3" sizes, have coating three mils thick. PC-3 valves in 4 to 8" sizes have coating ranging from six to eight mils thick. They are generally suitable to temperatures of 400°F.

(Plastic-coated valves are manufactured by DeZurik Corporation, Sartell, Minn.)

Check 1185 opposite last page.

"BUY LONG-LASTING TEFLON GASKETS FOR PIPING, FLANGES AND FITTINGS"

"With TEFLON jacketed gaskets the outstanding advantage is that you get the fine qualities of TEFLON without sacrificing resiliency and deformability. This, of course, is extremely important on your glass-lined steel piping and process equipment, light metal flanges, and glass pipe flanges and fittings.

"The first step in choosing the proper gasket is to select the type which will work best for you. TEFLON-jacketed gaskets come in four basic designs:

"Once this design is chosen, it's a matter of considering the filler material and thickness. For example, for high pressures, a corrugated stainless steel filler is suggested. Where the application is for glass-lined steel connections with low bolt loads, a rubber filler should be sandwiched between woven asbestos cloth. We offer many different types of fillers, depending on what you need—rubber, asbestos, cork, etc."

Why not let our representative in your area help you select the right gasket design? Discuss your problem with him or write for our Catalog AD-154.



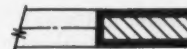
THE GARLOCK PACKING COMPANY, Palmyra, N. Y. For Prompt Service, contact one of our 26 sales offices and warehouses throughout the U. S. and Canada.

CANADIAN DIVISION: The Garlock Packing Company of Canada Limited
PLASTICS DIVISION: United States Gasket Company

Check 1184 opposite last page.



A: Slit Envelope. Teflon stock slit from outside diameter to within $\frac{1}{4}$ " of inside diameter.



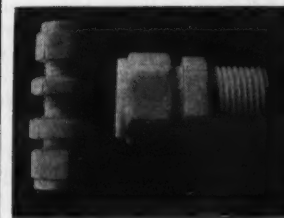
B: Milled Envelope. Teflon stock machined from outside diameter to within $\frac{1}{2}$ " of inside diameter. Gasket I.D. does not interfere with process flow.



C: Formed Shield for large diameters and irregular opening such as elliptical manholes.



D: Double Jacket. Two jackets overlapping to protect O.D. as well as I.D. For glass-lined steel nozzles.



Teflon tube fittings

... for sizes of 1/16 through 1" OD tube, are now available. All standard Swagelok tube fitting shapes and sizes can be secured.

(Swagelok Teflon tube fittings are product of Crawford Fitting Company, 884 E. 140th St., Cleveland 10, Ohio.)

Check 1186 opposite last page.

corrosion
resistant

DURACOR

replaces costly metal fabrications

in the
METALWORKING
industry

Ceilcote engineers complete ventilating systems, gas scrubbing towers, hoods, tank covers, ducts, recovery tanks and other customized fabrications.



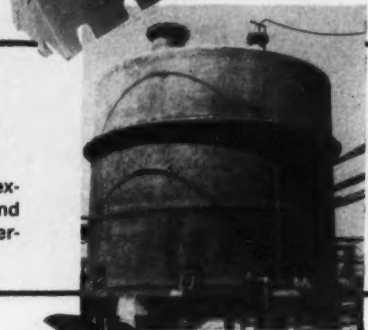
in the
TEXTILE
industry

Complex rayon spin machines, feed pipes, filters, screens, tanks and similar equipment are fabricated from Duracor.



in the
PETROLEUM
industry

Acid storage tanks, tank trailers, exhaust systems, pressure pipes and other Duracor products are rendering outstanding service.



in the
CHEMICAL
industry

Duracor is used extensively for special processing equipment, processing tanks, laboratory sinks, brine tanks, acid storage tanks, covers and ventilating systems.



Save up to 40% over costly metal structures with Duracor processing equipment and ventilating systems! A product of Ceilcote's 33 years of corrosionproofing experience, Duracor combines extreme chemical resistance and high strength with light weight, heat and flame resistance. **WRITE TODAY FOR VISUAL STANDARDS AND INDUSTRY SPECIFICATIONS!**

THE CEILCOTE COMPANY, inc.
4834 Ridge Road • Cleveland 9, Ohio



PHYSICAL PROPERTIES

Tensile Strength p.s.i.: 11,000-15,000
Flexural Strength p.s.i.: 20,000-30,000
Tensile Modulus of Elasticity p.s.i.: $1.2-1.4 \times 10^6$
Flexural Modulus of Elasticity p.s.i.: $0.78-1.6 \times 10^6$
Impact Izod, Notched ft.-lbs./in.: 30-40
Specific Gravity: 1.4
Coefficient of Linear Expansion: 9.5×10^{-6} in./in./°F.
Standard Color: Light Green/Gray
Maximum Temperature (Exposure): To 500°F.

CORROSION CONTROL

Nozzle liners of Teflon protect fragile tubes, minimize corrosion

Uses: Lining nozzle openings of reactors, vessels, condensers, pumps, other process equipment, and heat exchanger tubes at tube-sheet opening.

Features: Fabricated from Teflon, liners are inert to all acids and industrial chemicals up to 500°F. Non-adhesive characteristic of resin minimizes corrosion and reduces buildup of solids at nozzle opening.

Description: Shock resistance of material protects fragile nozzle openings, and lu-



Nozzle liner fabricated from Teflon

bricity eliminates erosion-corrosion problems at entry side of tube.

Liner OD fits standard Schedule 40 openings and can be force-fit into glass-lined nozzles. Lengths to fit nominal pipe sizes from 1" through 6" are being produced. Other sizes can be obtained for special requirements.

(Fluoroflex-T nozzle liners are product of Resistoflex Corporation, Roseland, N. J.)

Check 1188 opposite last page.

Large propeller agitators for aluminum processing

A shipment of 23 cast chrome molybdenum steel agitator propellers, for service in an aluminum processing plant in Africa, was recently completed. Of the 23 units, 17 have 96" diameters. They are carried on 10"-diam pipe main shaft.

Propellers will be used in sodium aluminate liquor which dissolves alumina in tanks 21' long x 20' deep. Equipment was ordered by Fria Compag-

CHEMPRO

makes them
all in Teflon!*



RING TYPE PACKINGS



ASBESTOS PACKINGS



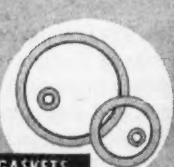
V-TYPE PACKINGS



FLEXIBLE SEAL CAGES



JACKETED GASKETS



SOLID RING GASKETS

*DuPont trademark

CHEMICAL & POWER PRODUCTS, INC.
9 Broadway, New York 4, N.Y.

Check the Bulletins you want:

- ☐ Packings & Seal Cages
- ☐ Gaskets
- ☐ Teflon Stock & Special Molded and Machined Parts

Name _____

Company _____

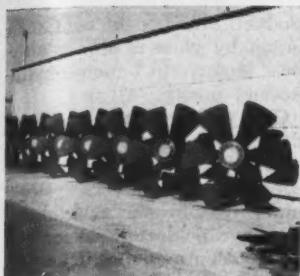
Street _____

City _____ State _____

Check 1187 opposite last page.

Check 1189 opposite last page.

CHEMICAL PROCESSING

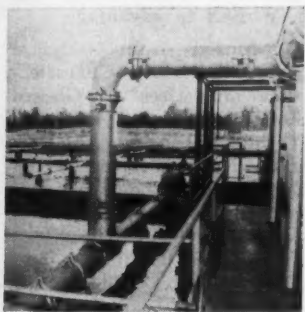


Agitator propellers of cast chrome molybdenum steel are slated for aluminum processing service in Africa

nie Internationale Pour la Production on De L'Alumine.

(Propeller agitators are product of Denver Equipment Company, 1400 17th St., Box 5268, Denver 17, Colo.)

Check 1190 opposite last page.



Over 48 tons of pipe

... was used in spray pond lines at Anderson, S.C., plant of Owens-Corning Fiberglas Corporation where recycled cooling water saturated with oxygen and other atmospheric gases posed severe corrosion hazard.

Problem of deterioration was handled by specifying 4-D wrought-iron pipe, varying in diameter from 3/4 to 12", for recycling water through 250,000-gal spray pond.

Product processing requires large quantities of cooling water, and recycling it for cooling and re-use cuts supply costs.

(4-D wrought-iron pipe was furnished by A. M. Byers Company, Clark Building, Pittsburgh 2, Pa.)

Check 1191 opposite last page.

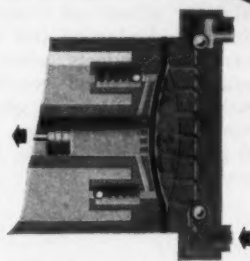
How Much Does Stuffing Box Leakage Cost You?



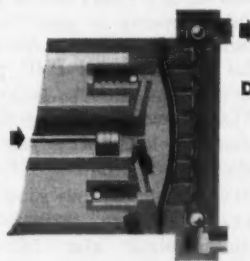
Lapp PULSAFEEDER CONTROLLED-VOLUME CHEMICAL PUMP

Many industrial plants, using small capacity chemical pumps, are confronted with the common problem of stuffing box leakage. Although much is done to accommodate for this pump deficiency, the day-to-day cost of various liquids lost through leakage is usually overlooked.

Normal stuffing box pump leakage is one to three drops per stroke. Thinking in terms of cost per gallon, consider a simplex stuffing box type pump handling phosphoric acid. An average two drops per stroke, 50 strokes per minute leakage represents a yearly operating loss of \$1,240. Such costly stuffing box leakage is typical. Yet it can be eliminated instantly by installing a Lapp Pulsafeeder diaphragm pump. The Pulsafeeder has no stuffing box . . . leakage and contamination of liquid being pumped is prevented by a hydraulically balanced diaphragm isolating the liquid from the pump's drive mechanism. Pumping speed is constant; variable flow results from variation in piston-stroke length, controlled manually by hand-wheel, or in Auto-Pneumatic models, by instrument air pressure responding to any instrument-measurable processing variable. Pulsafeeder capacities range from 585 ML per hour up to 24 gpm maximum flow and pressures from minus atmospheric to 6800 psig.



SUCTION
STROKE



DISCHARGE
STROKE

Lapp

WRITE FOR BULLETIN 440 containing typical applications, flow charts, description and specification of models of various capacities and constructions, also special leakage chart. Lapp Insulator Co., Inc., Process Equipment Division, 3511 Poplar St., Le Roy, New York.

Check 1192 opposite last page.



Partial list of companies using Ampco Centrifugal Pumps.

Abbott Laboratories
Adolph Coors Company
Allen-Bradley Company
Allied Chemical Corporation
Alox Corporation
American ENKA Corp.
The American Pulley Co.
Blatz Brewing Company
Brown & Williamson Tobacco Corporation
Bristol Laboratories, Inc.
Chagrin Chemicals, Inc.
Cincinnati Cleaning & Finishing Machinery Co.
City Water and Sewer Dept. Forrest City, Arkansas
Colton Chemical Co., a Div. of Air Reduction Co., Inc.
Consolidated Edison Co.
Continental Oil Company
Corn Products Company
Crescent Chemicals, Inc.
Crescent Chemical Company

Del Monte Foods
Emulsol Chemical Corp.
Enterprise Paint Mfg. Co.
Evans Cooperage Co., Inc.
The Fenn Manufacturing Co.
Ford Motor Company
General Chemical Division, Allied Chemical Corp.
The Genesee Brewing Company, Inc.
A. Gettelman Brewing Co.
Globe-Union, Incorporated
Graver Water Conditioning Co.
Peter Hand Brewery Co.
Huntington Laboratories, Incorporated
Independent Milwaukee Brewery
Industrial Dyestuff Co.
International Minerals and Chemical Corporation
Jones & Laughlin Steel Corporation
Koppers Company, Inc.
Kraft Foods Company
The E. B. Lanman Company
Master Lock Company
Midwest Chemicals, Inc.
Midwest Chemical Company

Miller Brewing Company
Modern Tool & Die Co.
Monsanto Chemical Co.
The Norwich Pharmacal Co.
National Aluminate Corp.
Patek Brothers, Inc.
Parke, Davis & Company
The Pure Oil Company
Petro-Tex Chemical Corp.
Pittsburgh Plate Glass Co.
Red Star Yeast & Products Company
Reichhold Chemicals, Inc.
Shell Chemical Corporation
Schenley Industries, Inc.
S. G. Taylor Chain Company, Inc.
Texas Butadiene & Chemical Corporation
J. C. Van Holten & Son, Inc.
Visco Products Co., Inc.
Torrington Water Co.
Union Carbide Chemicals Co.
Western Electric Co., Inc.
Westinghouse Electric Corp.
Wilcoxon Company
Wisconsin Chemical Corp.
Wm. H. Allen & Co.



Companies with a critical eye on the cost of pumping corrosives use

AMPCO® CENTRIFUGAL PUMPS

Stainless steel, Ampco Metal, Ilium "G", elastomer- and rubber-lined pumps — available from stock. Engineered to resist velocity corrosion, and erosion. Special-pump features at standard-pump prices.

Let your Ampco Field Engineer help you cut pumping costs.

Write us for his name.



AMPCO METAL, INC. DEPT. 139J, MILWAUKEE 46, WISCONSIN
West Coast Plant: Burbank, Calif. • Southwest Plant: Garland (Dallas County), Texas

Check 1193 opposite last page.

CORROSION CONTROL

Glassed-steel vessels used for variety of reasons

Play key role in many industries

Outstanding corrosion resistance of borosilicate-glass-coated steel vessels and equipment is only one of the reasons why they are used for many chemical processing operations. Others are absence of catalytic effect, easy cleanability, and property of non-contamination of products. Recent technical paper discusses each of these in turn.

Corrosion Resistance

In general, corrosion resistance of glassed steel is excellent for all acids, except hydrofluoric, at temperatures to 325°F. One exception is concentrated phosphoric which becomes corrosive at 300°F. Concentrated sulfuric, however, can be handled up to 450°F.

Catalytic Effect

Another reason for selection of glassed steel for some applications is its absence of catalytic effect on reaction. Metals and plastics and their corrosive products often do catalyze unwanted reactions. Jacketed reactors of glassed steel up to 7500-gal size, with 50 psi internal pressure, have been built.

Cleanability

Few materials cling to glassed steel and most of those that do are easily cleaned off. This property is used to advantage by Diamond Alkali in the production of PVC polymer. Like most polymers, PVC becomes so sticky that a cleanout is usually required after each batch. Glassed steel resists this sticking to a great degree. Anti-fouling characteristic also increases heat transfer rates.

Product Purity

Cleanability, of course, helps in production of a pure

product. Absence of contamination by glass is also a major factor in maintaining product purity.

One typical pharmaceutical plant uses glassed steel in production of steroids to critical specifications. Bromine, hydrobromic acid, chlorine, hydrochloric acid, and a series of organic acids enter into reaction. Bristol Laboratories uses glassed steel for manufacture of tetracycline, a process involving fermentation and acetylation.

In the petrochemical field, natural gas liquids are processed in glassed steel. In such processing, aluminum chloride and hydrochloric acid are used as catalysts for conversion of hydrocarbon liquids to other products. Chromic acid recovery, production of dyes, and handling of fatty acid chloride are other examples of where glassed steel has been used to advantage.

(Condensed from technical paper, "Corrosion Characteristics and Uses of Glassed Steel," which was presented at the 1959 Annual Meeting of the National Association of Corrosion Engineers in Chicago. Paper was presented by Dr. D. K. Priest of The Pfaunder Co., Div. of Pfaunder Permutit, Inc., Rochester 3, New York.)

Check 1194 opposite last page.



"The professor must have come across something good. I see he's writing down the formula."

Valves for caustic and sulfuric acid improved

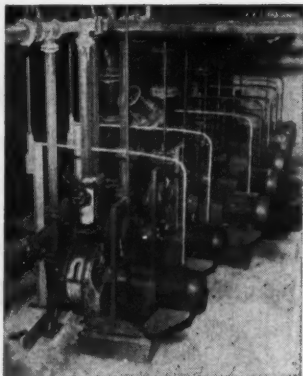
Uses: For handling alkalis and sulfuric acid over a wide range of concentrations.

Features: Principal change in valve is fullway design with full seat openings that maintain pressure and flow at the maximum for any specific size, ½ to 8".

Description: Gate valves are available with threaded or flanged ends, with either stainless or Monel trim. They are rated from 175 to 225 lb WOG. Causul metal — the material from which valve bodies, bonnets, and glands are made — is an austenitic iron containing about 20% nickel and substantial portion of copper, chromium, and molybdenum.

(Fig 1910 valves are product of Lunkenheimer Co., Cincinnati 14, Ohio.)

Check 1195 opposite last page.



Eighty centrifugal pumps

... circulate hot, dilute acids in treatment of rayon staple fibers at American Enka Corporation in Lowland, Tenn.

Bank of pumps comprises one of largest installations of impervious graphite processing equipment in world.

(Karbate centrifugal pumps are manufactured by National Carbon Company, division of Union Carbide Corporation, 11709 Madison Ave., Cleveland 7, Ohio.)

Check 1196 opposite last page.



AT LAST A CONCLUSIVE NON-DESTRUCTIVE TEST OF PRESSURE TUBING QUALITY

MEETS A.S.T.M. SPECIFICATIONS—Damascopipe is a new and improved method of RADAC eddy current testing. It consistently reveals surface and sub-surface cracks, seams, splits, holes, inclusions and other discontinuities not revealed by any other inspection method. On production run testing, Damascopipe's range of sensitivity exceeds requirements for pressure tubing outlined in A.S.T.M. Book of Standards, Part I.

EVERY TUBE IS TESTED—All Damascus pressure tubing is now Damascopipe inspected in addition to other accepted testing procedures. Damascopipe is an absolute test of quality, revealing the presence, location and size of harmful flaws. The entire periphery of the tube is examined inside and out, through the wall, and for the full tube length. *This is a 100% check*—each tube is inspected and imperfect tubes are automatically rejected.

SUITABLE FOR NUCLEAR WORK—For nuclear or other critical applications, Damascopipe can be even more closely calibrated to yield a tube of super quality. Damascopipe is powered by batteries which eliminate the variable effects caused by current surges. It also employs modulation analysis to separate eddy current signals from background interference.



FOR COMPLETE INFORMATION ON DAMASCOPipe TESTING

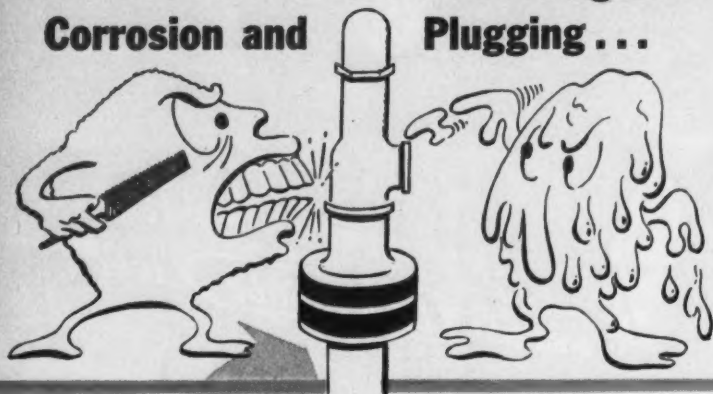
Write for bulletin describing operation, range of sensitivity, advantages, and general background on Damascopipe testing.

 **DAMASCUS TUBE COMPANY**
STAINLESS STEEL TUBING AND PIPE
GREENVILLE, PENNSYLVANIA



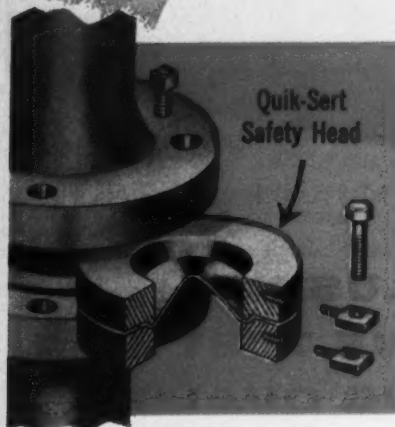
Check 1197 opposite last page.

How To Protect Relief Valves Against Corrosion and Plugging...



BS&B *Safety Head* Is A Damage Barrier That Doesn't Change Valve Operating Accuracy

A BS&B Quik-Sert Safety Head mounted to the inlet of a safety or relief valve provides these advantages not otherwise attainable...



- Isolates valve from product contamination.
- No product loss as long as the rupture disc remains intact.
- Process or product may be changed without varying valve design or construction.
- Overpressure relief is instant, reaching the valve through wide open, unrestricted orifice.
- Eliminates shut-down time during normal operation.
- Bottle-tight seal during normal operation assures no loss of product.

The absence of a BS&B Safety Head may mean a change of valve construction when process or product is modified. However, with valve mounted above a BS&B Quik-Sert Safety Head the same valve may be used for varying services without alteration. You save the cost of additional equipment. You save the cost of time-consuming valve changes.

If you have a corrosion and plugging problem with your relief valves, call your nearest BS&B Safety Head sales center now. Or write to...

BLACK, SIVALLS & BRYSON, INC.

Safety Head Division
Dept. 2-M10
7500 East 12th Street
Kansas City, Missouri



Check 1198 opposite last page.

CORROSION CONTROL

Stainless steel chain serves in 20% H₂SO₄.

Type 321 stainless steel chains are being used in sulfuric acids of concentrations up to 20% strength and at



Corrosive acid treatment is given to tube rounds in pickling bath. They are supported by stainless steel chains

temperatures to 200°F, for extended periods of time. Continued high rate of production depends on chains' durability.

(Stainless steel chains are product of American Chain Division, American Chain & Cable Company, York, Pa.)

Check 1199 opposite last page.

(Chains are fabricated from Type 321 stainless steel produced by Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.)

Check 1200 opposite last page.

Inhibits action of HCl without forming film

Uses: Inhibits hydrochloric acid in metal-cleaning operations.

Features: Doesn't deposit waxy surface film on treated metal. Inhibitor won't precipitate in presence of ferric ions.

NO DANGER EVEN IF DIAPHRAGM FAILS

YOU ARE SAFE with **ROCKWELL "D-D" VALVES**



When the diaphragm of a conventional diaphragm valve fails, there's leakage, loss, contamination, trouble. With the "D-D" valve this can't happen! If the diaphragm breaks, the disc still provides complete shut-off.

Consider this carefully where present diaphragm maintenance is so important in corrosive, abrasive, vacuum or other service.

"D-D" Valves are made in any metal or lined with glass, rubber or plastics. Manual or automatic operation. Bulletin 800 on request.

THIS DISC MAKES CLOSURE POSITIVE—SURE



W. S. ROCKWELL COMPANY

2209 ELIOT STREET • FAIRFIELD, CONN.

Check 1201 opposite last page.

CHEMICAL PROCESSING

CORROSION CONTROL

Description: Fatty-nitrogen derivative is effective in 5, 10, and 15% HCl solutions over wide range of temperatures, and at economical concentrations. Controls corrosion on 316 and 420 stainless steel, monel, bronze, and mild steel.

(Armohib 28 is development of Armour Industrial Chemical Co., Div. of Armour & Co., 1355 W. 31st St., Chicago 9, Illinois.)

Check 1202 opposite last page.

Tape coating is strong, heat resistant

Uses: Protective coating for pipelines.

Features: Extra strength and more heat resistance.

Description: High-density-polyethylene preformed coating is applied cold to transmission pipelines by tensioned-spindle equipment.

It combines new qualities with inherent stability and electrical and water insulation properties of similar conventional tapes.

Product was field tested on 300 miles of pipeline under wide range of conditions during two-year developmental period.

It doesn't require primer or drying or cooling time; won't exude fumes or cause fire hazards.

(Polyken 960 tape coating is being introduced by Polyken Sales Division of The Kendall Company, 309 W. Jackson Blvd., Chicago 6, Ill.)

Check 1203 opposite last page.

Stainless alloy steel, designed to resist corrosion of hot sulfuric acid, is described with data on resistance to other corrosives in Union 20-S Bul—Union Steel Corporation, Union, N.J.

Check 1204 opposite last page.

NEW **Allflex** VIBRATION TAMERS

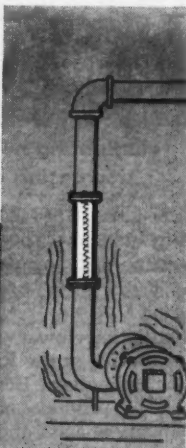
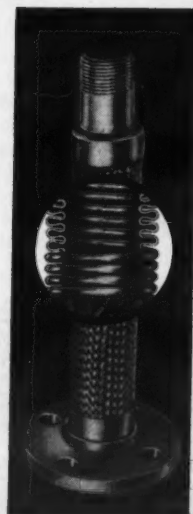
FOR EFFECTIVE PIPELINE VIBRATION CONTROL

- Remove "shakes" • Dampen noise
- End stressed fitting failures
- Prevent cracked walls • Compensate for expansion • Stop costly repair "downtime"
- "Smooth out" pump system pulsations, etc. . . .

ALLFLEX "VIBRATION TAMERS" are sold through leading Industrial Distributors. If not available locally, IMMEDIATE FACTORY SHIPMENT . . . IS ASSURED!

Write, wire, or phone TODAY for helpful, fact-filled ALLFLEX ENGINEERING DATA SHEET.

ALLIED METAL HOSE COMPANY
3784 Ninth St. • Long Island City 1, N.Y. • STIlwell 4-5173



Standard ALLFLEX "VIBRATION TAMERS" have Flanged or Threaded End Connections (either or both available) in

**STAINLESS
STEEL
BRONZE
MONEL**

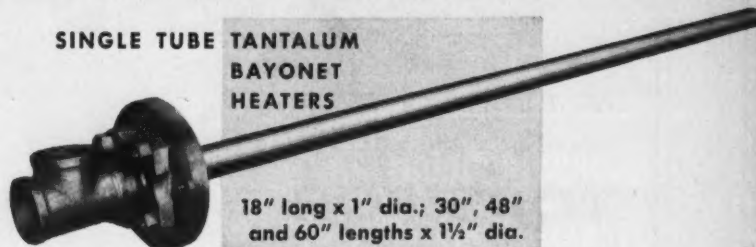
Check 1205 opposite last page.

IMMEDIATE DELIVERY FROM STOCK

FANSTEEL

TANTALUM EQUIPMENT

SINGLE TUBE TANTALUM BAYONET HEATERS



18" long x 1" dia.; 30", 48"
and 60" lengths x 1½" dia.

THREE-TUBE TANTALUM BAYONET HEATERS



69" long
1½" diameter

TANTALUM TAPERED TUBE CONDENSERS



3" x 2" x 36" and 6" x 2" x 60"

Here's another big step in Fansteel's stock expansion program to better serve the chemical industry. These and other Fansteel tantalum products—such as heat exchangers and coil and "U" type heaters—are gaining universal acceptance wherever chemical processing equipment must be contamination-free, acid- and corrosion-proof. Fansteel is the only supplier of tantalum equipment who performs the entire job—produces the metal from ore, engineers the application, designs and builds the equipment.

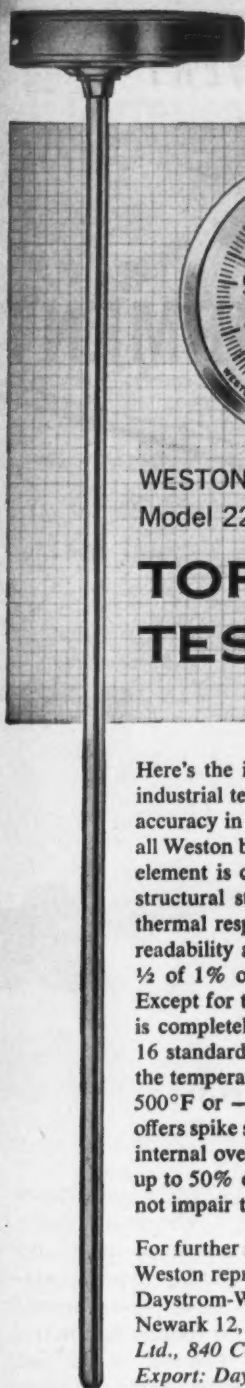
FANSTEEL

Address inquiries to
Equipment Department,
Metals and Fabrication Division

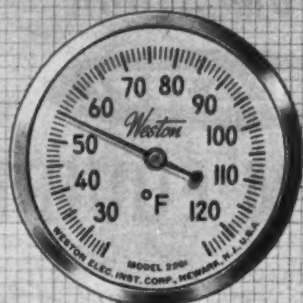
G593A

FANSTEEL METALLURGICAL CORPORATION North Chicago, Ill., U.S.A.

Check 1206 opposite last page.



ACTUAL SIZE



WESTON

Model 2261 Bimetals are

TOPS FOR TESTING

Here's the ideal thermometer for lab or industrial testing. It offers consistent accuracy in the face of general abuse. Like all Weston bimetals, its sensitive helical element is characterized by exceptional structural stability and fast, dependable thermal response. This results in excellent readability and assured accuracy within $\frac{1}{2}$ of 1% of the full thermometer range. Except for the scale glass, Model 2261 is completely encased in stainless steel. 16 standard ranges are available covering the temperature spectrum from -100° to 500°F or -100° to 250°C . Weston also offers spike stem versions for food testing or internal oven use. Abnormal temperatures up to 50% over or under scale range will not impair the accuracy of Model 2261.

For further information, consult your local Weston representative, or write to Daystrom-Weston Sales Division, Newark 12, N. J., In Canada: Daystrom Ltd., 840 Caledonia Rd., Toronto 19, Ont. Export: Daystrom Int'l., 100 Empire St., Newark 12, N. J.

WESTON



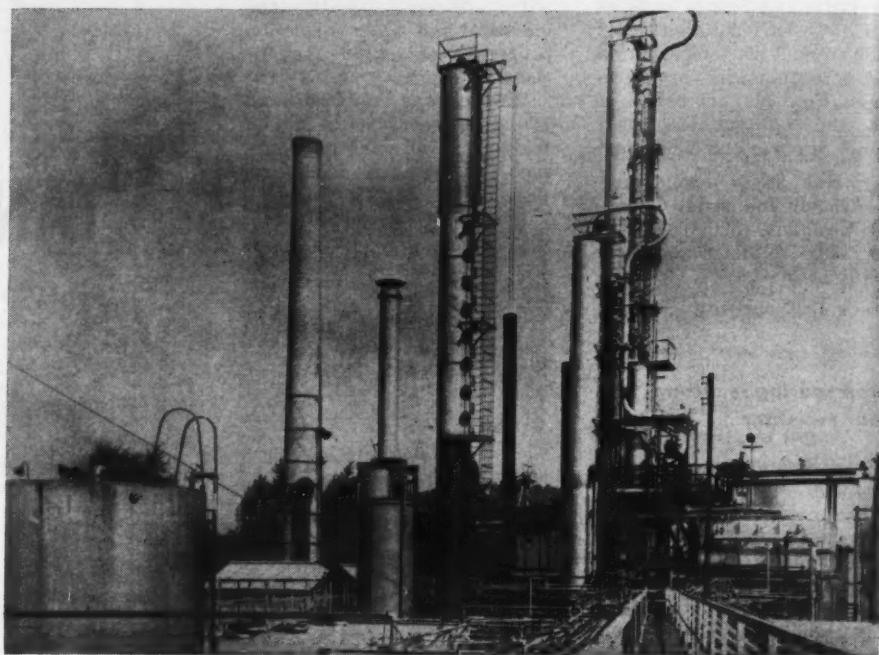
Bi-metal Thermometers

WORLD LEADER IN MEASUREMENT AND CONTROL

Check 1207 opposite last page.



U.S. and WORLD
PETROCHEMICALS



Fin-tube exchangers cut tower costs

**Reduce temperature of bottoms from 550 to 300°F,
eliminating need for water-cooled pumps and
decreasing amount of insulation required**

GORDON WEYERMULLER, Petrochemical Editor

Ninety-foot distillation tower (Fig 1) recently placed in service at the Franklin, Pa., refinery of L. Sonneborn Sons, Inc., is enabling plant to produce close-cut solvents to meet many special and varied requirements within rigid limits.

Close control of fractionation is facilitated by the unusually large number of trays in upper section of tower. Tower employs bubble caps. Use of four fin-tube heat exchangers at bottom of tower is advantageous. They remove heat from bottoms before they reach pump. This eliminates the need for water-cooled

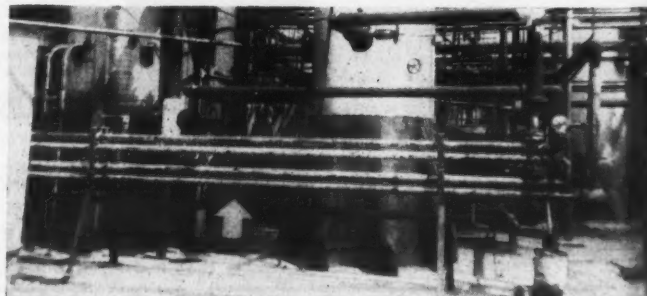


Fig 2 — Fin-tube exchangers (arrow) used to reduce temperature of bottoms from new tower (right)

CHEMICAL PROCESSING

Fig 1 — Ninety-foot tower (center) at L. Sonneborn is helping company meet demand for specialty solvents

pumps and greatly reduces amount of insulation required. Installation cost was lowered and savings in maintenance are being achieved.

Four fin-tube exchangers used (Fig 2) have a surface area of 102.8 sq ft each. System is set up so that there are two sets of exchangers in series — providing two units in parallel of two exchangers each.

Bottoms from tower pass at rate of 18 gpm through shells of fin-tube exchangers, then to suction of bottoms pump. Temperature of bottoms is reduced from 550 to 300°F by the exchangers.

Charge solution to tower, which serves as coolant, passes through tubes of exchangers at rate of 60 gpm. It is heated from 260 to 280°F in the fin-tube exchangers.

On occasion, excess steam in tower has caused bottoms to vapor lock in exchangers. This has not been serious and can be overcome by reversing direction of fluid flow on both sides of exchangers.

Tower is helping Sonneborn to produce high-quality rubber solvents, VM and P naphthas, Stoddard solvent, and various other petroleum fractions.

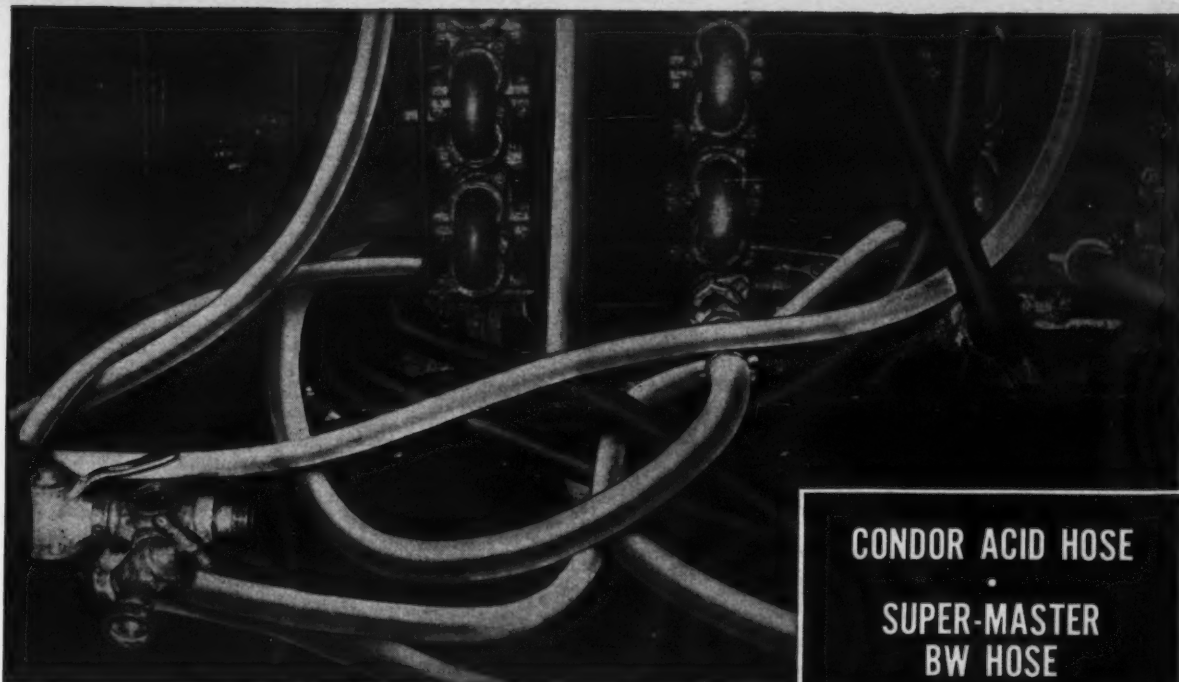
(Fin-tube exchangers are product of Griscom-Russell Co., 661 Third St., SE, Massillon, Ohio.)

Check 1208 opposite last page.

(For further information on specialty solvents contact L. Sonneborn Sons, Inc., 300 Fourth Ave., New York 10, New York.)

Check 1209 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.



R/M HOSE

Engineered for Chemical Processing

Engineered features of Raybestos-Manhattan hose for the chemical industry increase hose service life for every job requirement. Condor Acid Hose, for example, can handle practically all inorganic acids and salts up to 150° F. It is available with special tubes of rubber, neoprene, Butyl or Hypalon to withstand a wide variety of active chemicals. Super-Master BW Hose with woven wire reinforcement is practically burst-proof, ideal for handling steam, air and water under high pressures. R/M Teflon* Lined Hose assures complete resistance to most active corrosive and contaminating solutions, prevents caking of hose lines. Raybestos-Manhattan also manufactures special types of oil-proof hose for petro-chemical processing.

For general service at the chemical plant, Allflex is light, strong, and flexible as a rope . . . the easiest handling all-purpose hose made for use with air, water, oil and gases—even mild chemicals.

Where corrosion, wear, or expansion are problems with metal pipe, use Condor Flexible Rubber Pipe that outlasts iron or steel. R/M Rubber Expansion Joints are engineered to prevent stresses of expansion, misalignment, and insulate vibration.

For every application in the chemical industry, there's an R/M hose or Condor Flexible Rubber Pipe to do a better job, longer . . . give you "More Use per Dollar." Discuss your requirements with an R/M representative.

CONDOR ACID HOSE

SUPER-MASTER
BW HOSE

for Steam, Water, Air

R/M TEFLON* LINED
HOSE

ALLFLEX
ALL PURPOSE HOSE

PARANITE
OIL-PROOF HOSE

CONDOR FLEXIBLE
RUBBER PIPE

R/M EXPANSION
JOINTS

"More Use per Dollar"

WRITE FOR BULLETINS

*Teflon—A Dupont trademark

RM-608

BELTS • HOSE • ROLL COVERINGS • TANK LININGS • INDUSTRIAL RUBBER SPECIALTIES

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Other R/M products: Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls



Check 1210 opposite last page.



STAINLESS TANKS
for formaldehyde storage at Western chemical plant.

Puget Sound Fabricates Chemical from industry's "specs"

Located "on the spot" in the West, the personnel and facilities at Puget Sound are geared to offer intimate attention and undivided responsibility on any custom fabricating job involving steel plate and alloys up to 1" in thickness. Engineering staff and shop personnel are thoroughly experienced in working with clad metals, alloys and special protective linings for vessels, tanks and plant equipment designed to meet exacting chemical processing requirements.

The opportunity to talk over projects of any size and complexity is welcomed. Fabricating recommendations and cost estimates are promptly supplied from your blueprint plans at no obligation.

REQUEST BROCHURE NO. M-59



PS **PUGET SOUND**
F **FABRICATORS, INC.**
Craftsmen in Metals

3670 E. Marginal Way • Seattle 4, Washington

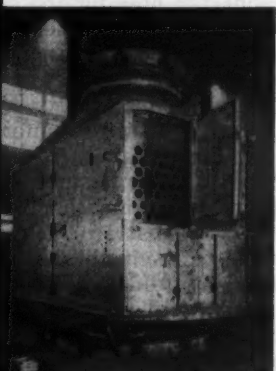


WATER FILTER TANKS
of carbon steel for Western petrochemical plant.



CAUSTIC STORAGE TANKS
fabricated of nickel-clad for large chemical producer in Western Canada.

AIR PRE-HEATER
and casing of carbon steel for refinery in the West.



HEAT EXCHANGER
combining stainless and mild steel for installation in Western electro-chemical plant.

Check 1211 opposite last page.

PETROCHEMICALS

Oil designed for use in instruments

Protects against rust from
-75 to 350°F

Uses: For all types of instruments and timers, bearings, pneumatic systems, hydraulic systems, control boxes, and electric motors.

Features: Lubricant has a low evaporation rate that enables it to remain fluid for long periods.

Description: Medium viscosity diester oil is suitable for use over temperatures ranging from -75 to 350°F. Oil is non-gumming and will not leave harmful deposits. It clings to metal in a fine film that protects delicate parts from humidity and salt.

(Anderol L-281 instrument oil is product of Lehigh Chemical Co., Industrial Lubricants Div., Chestertown, Md.)

Check 1212 opposite last page.

Alcohol in liquid phase is dehydrogenated in ketone process

Reaction process complete
at any temperature

In recently developed process for production of acetone and methylethylketone by catalytic dehydrogenation of secondary alcohol of petroleum derivatives, liquid rather than vapor, phase of alcohol is treated.

Displacement of equilibrium is accomplished by elimination of hydrogen as it forms. Reaction is thus complete at any temperature. Provided catalyst is sufficiently active, action can be carried out at low temperatures.

In practice, hydrogen is easily removed by treatment of alcohol in liquid phase and at boiling point. Temperature selected must be such as to ensure proper reaction velocity with minimum inhibition of catalyst by ketone.

Industrially, working temperature is generally 300°F. It is definitely higher than normal boiling points of alcohols. Two methods are used:

1) Use of third inert solvent with high boiling point and reaction at atmospheric pressure. This method is usually adopted when anhydrous alcohols are processed.

2) Working at a certain pressure. This method is adopted for hydrated alcohols (azeotropes).

Process can be used for conversion of majority of secondary alcohols (aliphatic or cyclic, anhydrous or hydrated) into corresponding ketones. It is extremely flexible. For example, same plant can process isopropyl alcohol and secondary butyl alcohol alternately, without shut-down of unit.

(All information regarding I.F.P. ketone manufacturing process and its licensing can be obtained from Institut Francals du Pétrole, 4 Place Bir-Hacheim, Rueil-Malmaison Seine-et-Oise, France.)

Tank-cleaning jet tool controlled remotely

Uses: Cleaning small tanks, horizontal or cylindrical tanks, and tankcars.

Features: Jet tool may be suspended inside tank and cleaning service controlled from outside so personnel are not exposed to toxic fumes or solvents.

Description: Solvents are expelled from two nozzles in jet head that rotates through 360°, both horizontally and vertically, so all internal surfaces are sprayed.

When jet head is suspended in tank and opening sealed with plate, solvents are transmitted through line to head from truck-mounted pump outside tank. Fluid powering hydraulic motor which rotates jet head is conducted by other lines.

Combination of force of liquid streams and chemical action of solvents cuts cleaning time while giving more thorough job than mechanical methods.

(Dowell Zingger is manufactured by Dowell, Inc., PO Box 536, Tulsa 1, Okla.)

Check 1213 opposite last page.

**Facilitate maintenance
of petrochemical pump
with back pull-out**

Designed to meet most requirements of refineries and allied industries are two process pumps designed for petroleum and petrochemical applications.

First model, Figure 3775 enclosed impeller-type centrifugal pump, is center-line-mount unit with vertically split casing, water-cooled seal chamber and bearing housing. It has internal mechanical seal.

Maintenance is facilitated by pump's back pull-out design.

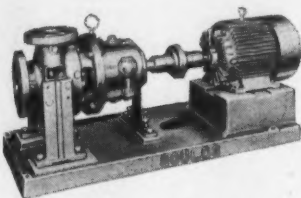


Figure 3775 enclosed impeller-type pump

All rotating parts may be removed without disturbing pipe connections or driver by using spacer coupling.

Maximum pumping capacity is 850 gpm; maximum working temperature, 600°F; maximum working pressure, 550 lb; and hydrostatic test pressure, 1100 lb.

Second model, Figure 3675, is close-coupled version of first with liquid end bolted to flange-faced motor. Rotating parts are assembled on motor-shaft extension. Also available in 11 sizes, it has same rating as first model. Maximum temperature is 275°F; maximum working pressure, 275 lb; and hydrostatic test pressure, 1100 lb.

(Figure 3775 and 3675 pumps are product of Goulds Pumps, Inc., 57 Black Brook Rd., Seneca Falls, N. Y.)

Check 1214 opposite last page.

Flowmeters which measure flow rates ranging from 20 to 100 gpm are depicted in Bul OG-415—Meter and Valve Division, Rockwell Manufacturing Company, 400 N. Lexington Ave., Pittsburgh 8, Pa.

Check 1215 opposite last page.

SELECT YOUR INNERCORES
from brass, 35% alloy bronze, 48% nickel alloy steel, monel, stainless steel, other alloys. Name the properties you need and ask for TITEFLEX, seamed or seamless. Remember, we manufacture it.

all flexible metal hose is not alike!
titeflex gives more
for your money!



SELECT YOUR FITTINGS
Precision-made, practically part of the hose. Assemblies to your specified length. Remember, we manufacture it.

SELECT YOUR BRAIDING
from round wire, flat ribbon, or a combination, in silicon-bronze, nickel, AISI-321 stainless, copperclad steel. TITEFLEX braid is engineered to last longer. Remember, we manufacture it.

A TITEFLEX EXTRA: Less weight! More flexibility!

A TITEFLEX EXTRA: Smaller bend radius than most competitive hose.

A TITEFLEX EXTRA: Quality under such tight control that its features can meet or surpass your toughest specifications.

A TITEFLEX EXTRA: Every inch of metal hose, inside and out, made right in our own plant.

A TITEFLEX EXTRA: Wide selection in types, sizes and metals, for "problem" applications.

A TITEFLEX EXTRA: Fittings guaranteed against blow-off at their specified ranges of operating temperatures and pressures.

A TITEFLEX EXTRA: We'll tackle the jobs others won't touch in hydraulic, lubrication, coolant, vacuum, transfer, live steam, fuel applications. Hot tars, solvents or chemicals in these industries: automotive, aircraft,

marine, machine tool, process machinery, industrial engines, air conditioning and refrigeration, highway equipment, nuclear energy equipment.

For complete assistance, contact your Titeflex distributor. He's in the Yellow Pages, or write direct.

from end to end,
inside and out,
made right in our own plant

titeflex
T

titeflex inc. springfield mass. PACIFIC DIVISION • SANTA MONICA • CALIFORNIA

Check 1216 opposite last page.

"...yet we have **IMPROVED it**"

The Marsh Stainless Steel Needle Valve could have gone right on being the finest in its field...yet we have improved it



...with fabulous
"TEFLON"
packing

Note the "close-up." The Marsh Marpak packing system, originated in the Marsh Needle Valve, was one of the factors that has enabled it to stand up and work right under pressures up to 10,000 psi. Now "Teflon" is used in this packing system—the miracle material of almost incredible toughness, resilience and non-adhesive properties...properties that are not impaired by the most powerful of solvents, acids, or alkalis even at temperatures up to 500° F.

Net result: The guaranteed application-range (up to 10,000 psi) is now effective at any temperature up to 500° F. (In other makes, permissible temperature decreases as pressure increases.)

Marsh Marpak Teflon Packing System is standard in Marsh 416 Stainless Steel Needle Throttling Valves. Ask for facts.

MARSH Needle Valve in 416

stainless steel throughout
Now with "Teflon" Packing

MARSH INSTRUMENT COMPANY, Division of Colorado Oil and Gas Corporation, Dept. 2, Skokie, Ill. • Marsh Instrument and Valve Co. (Canada) Ltd., 8407 103rd St., Edmonton, Alberta • Houston Branch Plant: 1121 Rothwell St., Sect. 15, Houston, Texas

Check 1217 opposite last page.

UNIQUE PUMP DESIGN IN PLASTIC NO STUFFING BOX OR SHAFT SEALS

ELIMINATES SHAFT LEAKAGE, SCORING, CORROSION
NEW LOW-MAINTENANCE FEATURES:

■ No shaft seals ■ No metal parts in contact with fluid ■ Simple, sturdy, minimal maintenance ■ Flexible liner absorbs abrasive action of suspended solids ■ Non-agitating ■ Non-contaminating ■ Self-priming; high vacuum ■ Operates wet or dry ■ Capacity range 1/3 to 40 Gallons Per Minute

Vanton Plastic Pumps have for years been handling the toughest pumping problems in process plants, pilot operations, and laboratories. They do the routine jobs better, and save overall costs as well! Low-cost, versatile, simply but carefully engineered, their combination of radically new design principle plus plastic minimizes maintenance, gives complete protection against leakage, corrosion, contamination, abrasion.

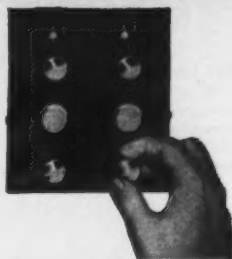
OPERATES LIKE SQUEEGEE ON RUBBER HOSE: all fluid moves in channel between outside of flexible rubber or synthetic liner, and inside of molded plastic or stainless bodyblock. Pumping mechanism is rotor mounted on eccentric shaft inside liner. At each revolution it creates progressive squeegee action on fluid trapped between liner and housing.

Plastic Materials include: PVC, high-temperature polyethylene, Teflon (DuPont), Buna N, bakelite, etc.; even stainless steel to handle any commercial corrosive.

**WRITE FOR FREE CATALOG TODAY!
VANTON PUMP & EQUIPMENT CORP.**

DIVISION OF COOPER ALLOY CORP., HILLSIDE, N.J.
SPECIALISTS IN PLASTIC FLUID HANDLING, PLASTIC PUMPS, VALVES, PIPING, FITTINGS, SPECIALTIES

Check 1219 opposite last page.



NEW INTEGRAL SIMPLICITY

in continuous, remote **TANK GAUGING**

Simple in principle and practice... the new Meriam Continuous-Purge Tank Gauge. Integral easy-reading purge-flow indicator and convenient front-panel operating knobs make operation simple, foolproof.

Based upon manometric principles, the Gauge has the accuracy and dependability inherent in the manometer. No calibration troubles, no mechanical difficulties. Indication is direct, dependable and continuous.

Rugged enough for outdoor use, the Gauge can also be panel mounted anywhere up to 600 feet from the tank. It is available in single- and multiple-tube models in ranges up to 60 inches, with a choice of indicating fluids to permit selection for sensitivity and readable accuracy required.

WRITE FOR BULLETIN L-10

The MERIAM Instrument Company

10920 Madison Avenue, Cleveland 2, Ohio U.S.A. 1962

Check 1218 opposite last page.

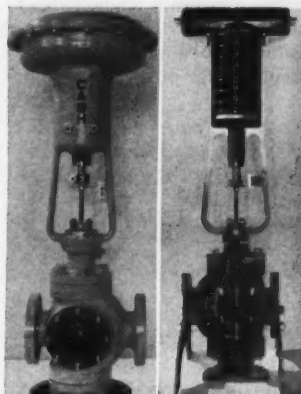
PETROCHEMICALS

Diaphragm motor valve available in variety of types

For use up to 2500 psi and 1200°F

Uses: For steam, gases, and liquids.

Features: Valve is available with split body, O-body, 3-way motor, F-body (meter operated), and lever type. Size range is from 1/2 through 16" depending upon type. It



Double-seat motor valve showing assembled and cutaway view

can be used at pressures up to 2500 psi and temperatures to 1200°F, also depending upon type of valve.

Description: Body materials are high-tensile iron, steel, or any castable material. Valve characteristics are bevel, equal percent V-port, skirt or top and bottom guided, and micro-sphere plug. Diaphragm is molded neoprene, with nylon insert. Springs are enclosed type, with thrust bearing on adjusting screw. Action is direct or reverse.

(Diaphragm motor valve 6000 is product of A. W. Cash Co., 540 N. 18th St., Decatur, Ill.)

Check 1220 opposite last page.

NEXT MONTH

Economics of steam-pyrolysis method for ethylene, which is increasingly being used by U. S. companies, will be covered in lead article for Petrochemicals section.

CHEMICAL PROCESSING

THAT'S INTERESTING

Speedy photos

Transmission of photographs so quickly that a field military commander can view aerial photos seconds after camera shutter clicks on plane or drone is a project Fairchild Camera and Instrument Corp. is working on for the Army.

Baby saver

A resuscitator 3" long, 2" in diameter that weighs only 7½ oz has been developed to help save lives of babies who have difficulty breathing at birth. It was built for Chemetron Corporation's National Cylinder Gas Division by the Stanton Scientific Company, Glendale, Calif. Device's face mask is a little larger than a 50-cent piece.

Waterproof foxhole

Chemistry has come to the aid of the foot soldier. A special formulation of urethane foam has been developed and field tested to waterproof and insulate foxholes. It is a product of American Latex Products Corp.



In this revolving drum, tablets are coated with syrups, powders and waxes. Because the drum is Stainless Steel, it takes only a few seconds to clean it with steam jets.

Stainless Steel equipment protects 100% product purity

at Eli Lilly and Company, Indianapolis, Indiana

"Science has created hundreds of lifesaving and pain-relieving formulas," says an official of Eli Lilly and Company. "But unless these formulas are produced in medicines that are 100% free of every possible contamination, they could do more harm than good. We make millions of tablets every month, for instance, and we must be positive that the ingredients are pure for every single one. That's why we use nothing but Stainless Steel for so much of our equipment.

"Stainless guarantees product purity. It resists corrosion. It's durable and hard, won't chip or crack. It has a smooth, dense surface that is easy to keep clean—and it is not harmed by the cleaning agents we must use. True, we paid more to install Stainless Steel, but it will save money in the long run because we don't have to worry about replacements."

Eliminate product contamination in your plant. Start by examining your equipment to see if it's a threat to cleanliness. Replace it with Stainless Steel. And specify USS Stainless Steel for service-tested quality.

USS Stainless Steel is available through your U.S. Steel representative or your local Steel Service Center.

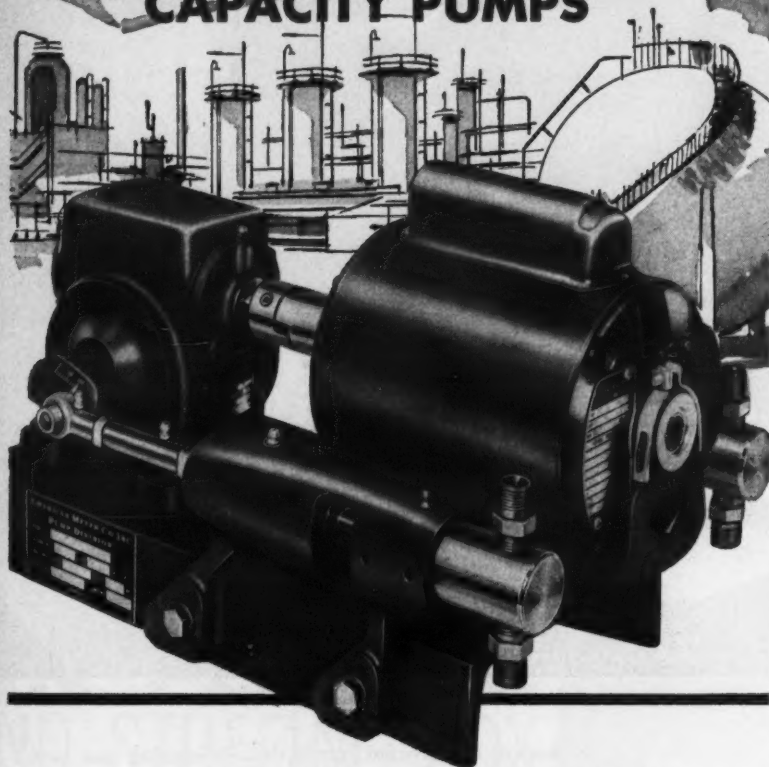
USS is a registered trademark

United States Steel Corporation—Pittsburgh
American Steel & Wire—Cleveland
National Tube—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

USS United States Steel

NEW

AMERICAN CONTROLLED CAPACITY PUMPS



JOB ENGINEERED FOR LONG-TERM ACCURACY AND LOWEST MAINTENANCE COSTS

New American controlled capacity pumps are precision built to meet the needs of Chemical Processing, Refining and Boiler Feed applications. Quality construction assures highest accuracy in feeding precisely metered fluids or slurries into low or high pressure systems in virtually all desired ratios, with flow, temperature, pressure, conductivity, PH and other controlled process variables. Control may be manual or automatic—with electric, hydraulic or pneumatic systems.

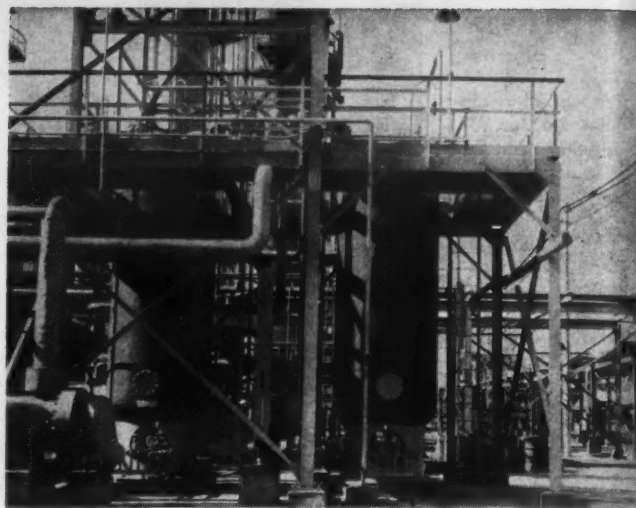
Newly designed models are available to handle a wide variety of "tough," corrosive and viscous materials.

Write today for full information on American's new controlled capacity pumps. They're sure to meet your fluid proportioning requirements.

AMERICAN
METER COMPANY
INCORPORATED (ESTABLISHED 1934)
pump division
13500 PHILMONT AVE., PHILADELPHIA 16, PENN.

Check 1221 opposite last page.

PETROCHEMICALS



Dryers in use at ammonia plant in Formosa

Formosa fertilizer plant dries hydrogen continuously

Two cylindrical columns containing activated alumina are used alternately to keep ammonia plant on stream by removing water from nearly half a million cu ft of gas per hour

GORDON WEYERMULLER, Petrochemical Editor
with WILLIAM WANG, Process Control Engineer
Nankang Fertilizer Company, Taipei, Formosa

Problem: Moisture had to be removed from impure hydrogen at 15°C to be used in the manufacture of ammonia at Nankang Fertilizer Company.

Final purification of hydrogen used for ammonia synthesis is accomplished with liquid nitrogen. Moisture in the hydrogen would deposit in the nitrogen wash equipment as water ice and rapidly plug it. Even a small amount of moisture in hydrogen would cut operating efficiency.

Solution: Plant installed a dryer, called a Lectrodryer, charged with activated alumina for drying the impure H₂ at rate of 480,000 cu ft/hr.

Dryer has two columns, each of which contains activated alumina. As wet hydrogen is passed through the alumina in one column, the moisture is adsorbed.

After one column has picked up a considerable quantity of water, valves are reversed to pass the hydrogen to be dried through second column. Meanwhile, alumina in first column is regenerated.

At Taiwan Fertilizer, it is necessary to switch and regenerate the columns at eight-hour intervals during normal operation. Regeneration procedure consists of first heating with hot waste gas for four hours, maintaining an outlet

temperature of about 200°C. This is followed by four hours cooling with cold water.

Results: Dryers have performed satisfactorily, helping to keep the plant on stream. Hydrogen is dried to -80°F dewpoint.

(Lectrodryer is product of Pittsburgh Lectrodryer, Division of McGraw Edison Co., 307 Thirty-second St., Pittsburgh 30, Pa.)

Check 1222 opposite last page.

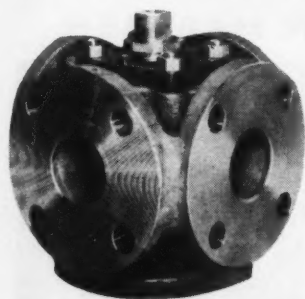
(Activated alumina is product of Chemicals Dept., Aluminum Company of America, Alcoa Bldg., Pittsburgh 19, Pennsylvania.)

Check 1223 opposite last page.

Gases, solvents, slurries and corrosives handled by multi-port valves

Teflon sleeves incorporated to eliminate lubrication

Uses: Plug-valve applications in handling of wide range of media — from hard-to-hold light gases and solvents to heavy slurries and



Five-port plug valve. Unit is also available as four-port type

corrosive liquids — under temperatures ranging from -150° to 400°F, and pressures from high vacuum to 275 psi.

Features: Multi-port design and non-lubricating feature reduce maintenance and minimize number of valves needed to achieve multiple flow patterns.

Description: Offered in four- and five-port models, stainless-steel plug valves have Teflon sleeves which do not require lubrication.

They are available in 150-lb



NEWPORT NEWS BUILT two 39'-7" horizontal gas scrubbers, such as this, for J. F. Pritchard & Co. They were made of ASTM-A212 Grade B fire box steel, with structural mesh steel interiors.

Gas scrubber made of 2⁷/₈" steel

Newport News builds almost any type of pressure vessel and other heavy process equipment

Here is one of two horizontal gas scrubbers recently built for an operating pressure of 1800 psi at 300°F.

Newport News made both vessels from fire box steel, 2⁷/₈ inches in thickness. We formed and automatically welded this steel into sections having a diameter of only 4 feet.

Rolling thick steel to this small diameter...no easy accomplishment, as you probably know... demonstrates the sort of jobs Newport News takes in stride.

Almost any type of heavy processing equipment is readily constructed by Newport News in a 225 acre plant comprising huge, fully equipped fabricating and machine shops, foundries, forge and die shops, heat treating and allied equipment as well as complete test facilities.

Newport News shop erection of

fabricated units helps to speed assembly at your plant site.

Get a bid from Newport News on your present or future projects. Get the benefit of specialized production techniques. Look over the many ways in which Newport News can help you... write for "Facilities and Products", a very interesting booklet. It's yours for the asking.

ENGINEERS Desirable positions available at Newport News for Designers and Engineers in many categories. Address inquiries to Employment Manager.



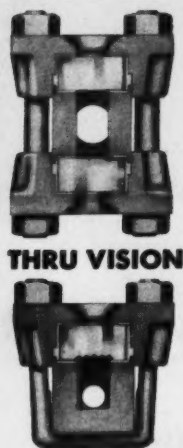
ROLLING 2⁷/₈" STEEL for gas scrubbers. The steel, in a hot condition, was formed on the heavy bending equipment shown here. It will cold roll mild steel up to 3 inches thick, and will hot roll any grade of steel up to a thickness of 5 inches.

Newport News Shipbuilding and Dry Dock Company
Newport News, Virginia

Check 1224 opposite last page.

HIGH PRESSURE GAUGES

USED IN
REFINERIES
AND
CHEMICAL PLANTS
THROUGHOUT
THE WORLD



THRU VISION

REFLEX
Single or Multiple
Sections

TUBULAR
Gauge Cocks
•
Large Chamber
Reflex Gauges
•
Heated or Cooled
Gauges

SEND FOR
COMPLETE
CATALOGUE

STRAHMAN VALVES, Inc.
NICOLET AVE., FLORHAM PARK, N. J.

Check 1225 opposite last page.

PETROCHEMICALS

class from ½ through 2" sizes, with both flanged (Fig 47 and 57) and screwed (Fig 46 and 56) ends.

Both models are available with bodies and plugs of 316 stainless and Alloy 20, and carbon-steel bodies with 304 stainless plugs. They may also be ordered in aluminum, bronze, Hastelloys, Monel, nickel, and 304 stainless.

Valves meet MSS-SP42 specifications; flanges and wall thicknesses meet or exceed ASA standards.

They have internal ribbed construction for locking sleeves in position while allowing for sleeve expansion and contraction without leakage.

(Tufline multi-port plug valves are manufactured by Continental Manufacturing Co., 247 Park Ave., New York 17, N.Y.)

Check 1226 opposite last page.

Petrochemical plants engineered and/or constructed by company in recent years are depicted in colorful eight-page booklet commemorating 100th anniversary of birth of petroleum industry. Lummus Bul—The Lummus Company, 385 Madison Ave., New York 17, N. Y.

Check 1227 opposite last page.

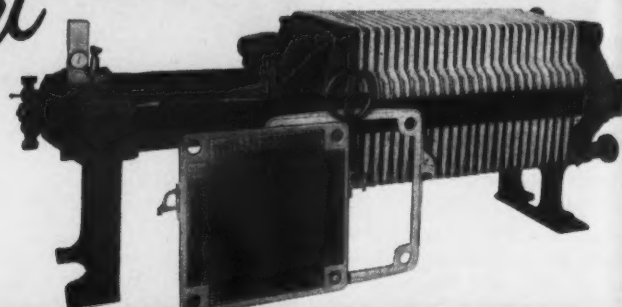
Texas, Japanese firms collaborate on plants

Two petrochemical process plants to be constructed in Japan by Lino Shipbuilding & Engineering Co., Ltd., Tokyo, will be designed in the Dallas, Texas, office of Tears Engineers.

Cooperative agreement, approved by Japanese government, involves \$6-million synthesis gas production plant for Nitto Chemical Industry Company, Ltd., Tokyo, Yokohama, and Hachinohe; and \$6.5-million acetylene and ethylene production sections of \$20-million Kyowa Fermentation Industry Co., Ltd., project at Ube, Japan.

The latter project will produce butanol and octanol from petroleum naphtha, while the Nitto plant eventually will

Get "PROTECTED" FILTRATION



in

Shriver Plastic Filter Presses

To resist corrosion and contamination, Shriver Filter Presses are now available with plates and frames of Fiberglas—reinforced polyester, Havg, rubber, impregnated wood, and metal covered with polyvinyl chloride, other plastics or rubber.

Plates and frames of these materials can be furnished at lower cost than those of equally corrosion-resistant metals. They are often even more satisfactory. We invite your inquiries.

T. SHRIVER & COMPANY, INC.

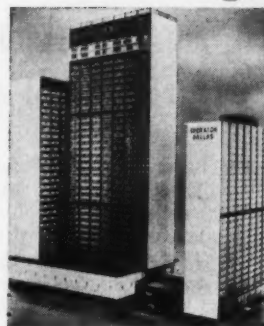
846 HAMILTON STREET • HARRISON, N. J.

SALES REPRESENTATIVES IN: Chicago, Ill.—Atlanta, Ga.—Houston, Tex.—Detroit, Mich.
St. Louis, Mo.—San Francisco, Cal.—Montreal, Que.—Toronto, Ont.

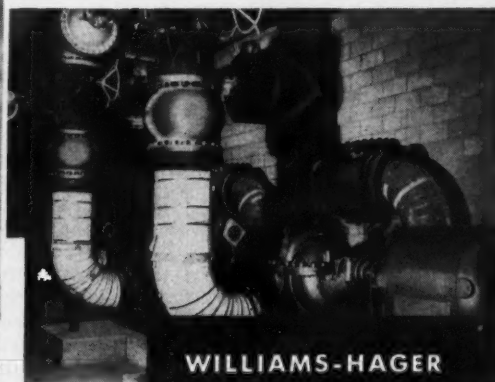
FILTER PRESSES • VERTICAL LEAF FILTERS • FILTER MEDIA
HORIZONTAL PLATE FILTERS • CONTINUOUS THICKENERS
SLAB FORMERS • DIAPHRAGM PUMPS • ELECTROLYTIC CELLS

Check 1228 opposite last page.

SURE PROTECTION against WATER HAMMER



Architects and Engineers
Welton Becker, FAIA and Associates
General Contractor
J. W. Bateson Co., Inc., Dallas
Mechanical Contractor
Farwell-Wallace, Dallas



WILLIAMS-HAGER

Silent
Check Valves

At the dramatic new Southland Center in Dallas, 57 Williams-Hager Silent Check Valves protect the plumbing, heating and air conditioning systems from surge pressures and resulting water hammer. Write for Bulletin: No. 654 on the Valves, No. 851 on Cause, Effect and Control of Water Hammer.

THE WILLIAMS GAUGE CO., INC.

146 Stanwix Street

2 Gateway Center

Pittsburgh 22, Pa.

Our 73rd Year 1886-1959

Check 1229 opposite last page.

CHEMICAL PROCESSING

produce 125 tons daily of synthetic ammonia, utilizing Texaco Development Corporation process. This produces synthesis gas by partial oxidation of heavy fuel oil.

Pipe insulation usable at -300° to +220°F

Uses: Pipe insulation for use at temperatures ranging from -300° to +220°F.

Features: Product has K factor of 0.14 at 70°F mean temperature, according to thermal conductivity tests. A closed-cell synthetic, it will not burn.

Description: A urethane foam, insulation has closed-cell content of 85% plus, and density of 2.3 lb/cu ft. Ma-



Low-temperature pipe insulation

terial has high compressive and flexural strengths, but may be cut and applied with standard tools.

It is non-toxic and non-irritating. Resistance to chemicals and heat is excellent.

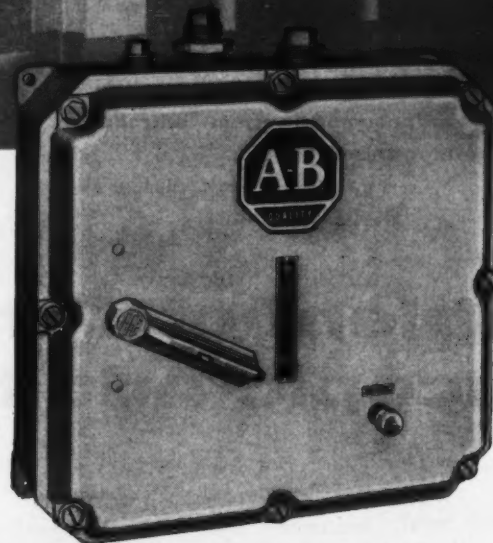
Material is available in accurate half-round sections of nominal thicknesses in standard pipe sizes. Sections are 36" long.

(Unarco, U-200 pipe insulation is development of Fibrous Products division, United Asbestos and Rubber Company, 1111 W. Perry St., Bloomington, Ill.)

Check 1230 opposite last page.

Process moisture monitor operation, applications and specifications are detailed in four-page Bul 1845—Analytical and Control Instrument Division, Consolidated Electrodynamics Corporation, 360 Sierra Madre Villa, Pasadena, Calif.

Check 1231 opposite last page.



Bulletin 713 Combination Starter with circuit breaker in NEMA Type 9 enclosure for hazardous dust locations.



NEMA 7
For Hazardous Gas Locations



NEMA 4
Watertight Weatherproof



NEMA 8
For Corrosive Hazardous Gas



NEMA 11
Corrosion-proof

Round-the-clock safety... and reliability... without costly maintenance

When hazardous locations require starters in explosion-proof enclosures, it usually means costly maintenance. But *not* when you use A-B starters, because you eliminate the expense of removing and replacing bolted covers for "regular" inspection! In all A-B starters there is only *ONE* moving part. This is your assurance of *millions* of trouble free operations. There are no bearings to stick... no flexible jumpers to break. And the double break, silver alloy contacts never need servicing—they remain in perfect operating condition until completely worn away. The permanently accurate thermal overload relays are another "plus" feature. Insist on Allen-Bradley controls... and save on maintenance throughout the years.

ALLEN-BRADLEY

Quality Motor Control

Allen-Bradley Co., 104 W. Greenfield Ave., Milwaukee 4, Wis. • In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

Check 1232 opposite last page.



Part of huge taconite plant on Mesabi Range. Three outside storage silos for bentonite are at left; two for soda ash at right



**MATERIAL HANDLING
and PACKAGING**

Huge amounts of bentonite and soda ash are required in manufacture of taconite pellets. Here's how a pneumatic system controlled by one operator at central panel . . .

Solves Problem of Conveying Hygroscopic Additives



Track-mounted Fuller-Kinyon pump moves from one outside bentonite-storage bin to another, transfers contents to process bins. Motorized rotary valve feeds material from silo to pump hopper

HYGROSCOPIC bentonite and soda ash, taconite-pelletizing additives, are conveyed without "sticking" in enclosed pneumatic conveyors at a huge Mesabi Range pelletizing plant. All flow—from receiving to process—is controlled by one man at a central graphic panel that shows, by lights, the path each material is taking at every moment.

Human error—which can be extremely costly in a complex operation producing as much as 20,000 long tons of pellets every day—is prevented by complex system of interlocks in the handling operation.

The bentonite and soda ash are unloaded from weather-sealed Airslide* cars at sepa-

rate covered unloading stations. A Fuller-Kinyon system transfers bentonite either to outside or in-plant silos. An Airveyor system does a similar unloading job on the soda ash.

Bentonite Handling

To unload a car holding 140,000 lb of bentonite, a flexible car connection is first attached. The material discharges into a 30'-long Airslide fluidizing conveyor which feeds the hopper of the pump.

Designed to handle finely powdered material, the fluidizing conveyor floats bentonite on a "belt" of low-pressure air. Conveying duct consists of parallel upper and lower chambers separated by an air-permeable membrane.

Low-pressure air flowing through bottom chamber bleeds upward through the

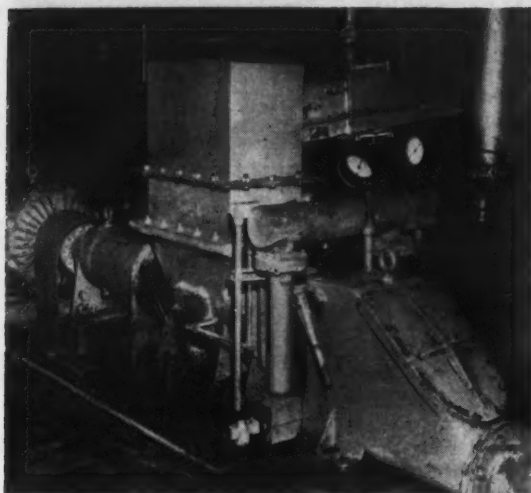
membrane, partially fluidizes the bentonite so it flows, like a liquid, under the force of gravity to pump hopper.

A 7" H2 stationary pump with 60-hp motor is used. Bentonite advances through pump barrel where it is compacted—to prevent blow-back—by decreasing pitch of impeller screw flights and a variable space between last flight and check valve.

Material enters a mixing chamber through check valve, and is there fluidized by compressed air introduced through air jets. In fluid state it is moved through pipeline, at 35 tph, to any one of three outside bentonite silos approximately 600' away. The silos have total capacity of eight million lb. Air supply is by self-cooled rotary compressor.

Special branch line permits transfer direct, by means of motorized diverting valve, to

*TM General American Transportation Corporation



Fuller-Kinyon pump, fed by Airslide conveyor (coming in at right rear from unloading station), delivers bentonite to outside storage silos

one of two bentonite silos inside the Additive Building. This valve is controlled from central panel.

Flow is automatically diverted from one bin to the next when a high-level indicator is tripped. There are 75 of these bin signals throughout the plant, and 55 two-way motorized valves.

Bentonite is transferred from outside silos to process bins in the Additive Building by a 7" Fuller-Kinyon pump. This rides a track in enclosed passageway beneath silos. Easily connected to either of the discharge spouts of the three overhead silos, pump delivers bentonite at a rate up to 1600 lb/min. Air here is also provided by a self-cooled rotary compressor.

Soda-ash Handling

A suction-type Airveyor system is used for soda ash

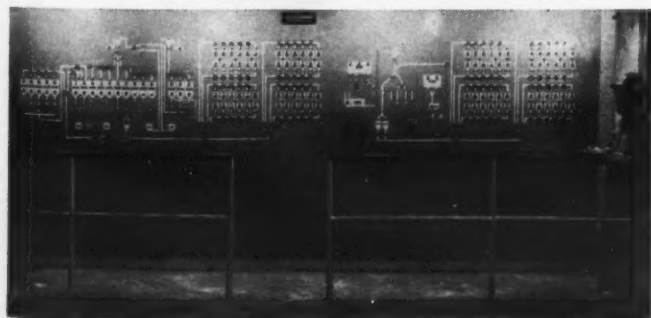
since this material will "stick" if compacted. System unloads incoming cars, holding 100,000 to 110,000 lb, to two outside storage silos each having a 1,333,000-lb capacity.

A second Airveyor system is above process bins in Additive Building. This can unload cars directly and also reclaims from the outside silos. A Sutorbuilt exhaustor provides suction.

Pelletizing

For the pelletizing process, bentonite and soda ash are blended and then paddle-mixed in the Additive Building. Another Fuller-Kinyon conveying system then delivers the mixture to any one of 24 service furnace feed bins in the Pelletizing Plant. Distances is up to 500'; transfer is at capacity of 35 tph.

Blend is now mixed with iron-ore concentrates and



Main control panel which rides herd on unloading, storing, and transfer of all additives used in pelletizing process

AUTOMATIC BATCHING HANDBOOK



EVERYTHING YOU NEED TO KNOW ABOUT AUTOMATIC BATCHING

- HOW TO DO IT
- HOW MUCH IT COSTS
- WHAT YOU NEED
- HOW TO USE WHAT YOU HAVE
- HOW TO SELECT THE RIGHT SYSTEM

If you are now combining two or more ingredients in any kind of formula or batch, write now for this new free automatic batching handbook. It describes in detail how automatic batching works, how to convert existing plant facilities or plan new plants for automatic operation. It illustrates the latest batching systems available, lets you select the right type for your particular needs. Also shows you how to combine materials handling equipment, storage facilities, and weighing equipment for greatest economy, increased production. This is the newest, most complete handbook on automatic batching available—be sure to write for your free copy today!



HOWE

THE HOWE SCALE CO. • RUTLAND, VT.
A SUBSIDIARY OF SAFETY INDUSTRIES, INC.

Check 1233 opposite last page.

NEW FROM CONTINENTAL

Electrically welded, leakproof flaring pails

nest to save storage and shipping costs



SINGLE ELECTRICALLY WELDED SEAM

Single seam construction

gives leakproof protection for hard-to-hold products

These pails offer greater strength and protection for liquid roofing cements, paint and petroleum products, dry or powdered materials. Ask your Continental man for details.



CONTINENTAL CAN COMPANY

Eastern Division: 100 E. 42nd Street, New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4
Canadian Division: 790 Bay St., Toronto, Ont.
Cuban Office: Apartado #1709, Havana

Check 1234 opposite last page.

HANDLING & PACKAGING

coal, and formed into small balls in declining rotating drums. These balls are fired at 2400°F in shaft furnaces to produce a hard, dense pallet.

Cool Handling

Separate system is used to move the coal. Fine, crushed anthracite is introduced into either of two tanks of a dual-tank Fuller-Fluxo conveying system in Additive Building. Tank-feed cutoff valve closes automatically when blow-tank vessel has full charge.

Predetermined timing cycle permits air to enter vessel at proper time through aeration ring near vessel line and an air valve at bottom of cone. Combined air released into vessel builds sufficient pressure to eject feed into and through conveying line to furnace feed bins up to 600' away. System of high-level bin indicators and motorized diverting valves, sending information back to main panel, automatically controls entire operation.

(All pneumatic handling equipment and control panel were engineered and manufactured by Fuller Co., Cata-sauqua, Pa.)

Check 1235 opposite last page.

Remote-control release of sling-chain loads promotes safety

Uses: Provides safe release of loads carried in sling chains.

Features: Crane operator releases load from cab.

Description: Pushing of button in cab activates solenoids at ends of a spreader bar. This expels chain from its hooks, releasing load. Load must be on floor, with tension removed from chain, before solenoids can be operated. Power failure will not release load.

(Acco solenoid chain release is development of American Chain Division, American Chain & Cable Company, Inc., York, Pa.)

Check 1236 opposite last page.

PUMP PROBLEMS

write
TABER

BEFORE DECIDING ON TYPE OF PUMPS..

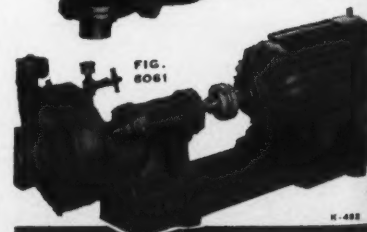
SEE
TABER BULLETIN 5

May avoid costly pump misapplication.

Vertical pump illustrated, for handling chemicals, please request Bulletin V-837. Horizontal Pump, Bulletin C-355.

TABER PUMP CO.

Est. 1859
291 ELM ST.
BUFFALO 3, N. Y.



TABER

Check 1237 opposite last page.

CHEMICAL PROCESSING

HANDLING & PACKAGING

Industrial-truck control saves battery power

But still lets operator pick any desired speed

A saving of up to 50% of battery power during maneuvering operations is reported for a recently announced electric-industrial-truck control. Besides adding to battery life, the control conserves motor brushes and contactor tips, keeps motor operating temperatures low, and provides an infinite number of speeds.

Control method employs full voltage across motor and varies current depending on speed desired. It uses a compound motor composed of three basic elements: 1) armature, 2) two sets of series fields, and 3) one set of shunt fields.

At low speeds, all series and shunt fields are employed. As truck picks up speed, part of series field is cut out. At top speed, all of the shunt field is also cut out.

(This type of control, dubbed Current Miser Control, is development of Automatic Transportation Company, Division of The Yale & Towne Manufacturing Company, 149 W. 87th St., Chicago 21, Ill.) Check 1238 opposite last page.

Protect feeder magnets with dust-tight covers

Dust-tight covers are being introduced to protect electromagnets on vibrating feeders. Innovation is intended to decrease maintenance requirements.

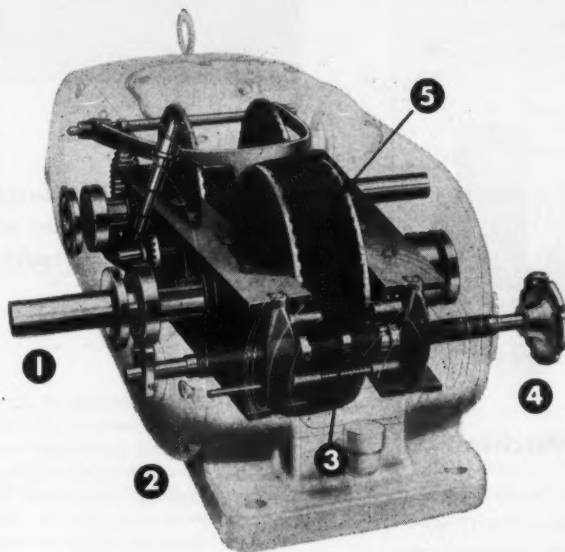
Available on manufacturer's complete line of feeders, covers, consisting of rubber gaskets and metal plates, bolt in place over magnet-housing openings.

Covers are standard equipment on three light-capacity feeders; optional on others. They are available for feeders already in operation.

(Magnet covers are available from Syntron Company, 110 Lexington Ave., Homer City, Pennsylvania.)

Check 1239 opposite last page.

PUT TEETH IN YOUR SPEED CHANGING JOBS



Get the positive, accurate control that only LINK-BELT's chain-driven P.I.V. can deliver

Yes, you put teeth into your speed changing jobs because Link-Belt P.I.V.—unlike other variable speed drives—utilizes an exclusive metal, self-tooth-forming chain.

Here's how it works! P.I.V. chain consists of a series of overlapping steel links. The links contain packs of slats which are free to move from side to side, singly or collectively, to serve as teeth. The chain meshes with radially grooved wheels, which are cut to a constant depth towards the wheel periphery. Beveled sides of the grooves offer gripping areas . . . provide a positive, nonslip contact at any speed, under all loads.

Makes changing speed simple too! A turn of the control screw simultaneously varies the effective diameters of the conically shaped wheels—closing one set, spreading the other. At the same time, the self-tooth-forming chain automatically adjusts to provide desired ratio between the input and output shafts.

BOOK 2274—Your Link-Belt office or authorized stock-carrying distributor has Book 2274 on P.I.V. drives from 1/2 to 25 hp. Refer to the yellow pages of your local phone directory under Power Transmission Equipment.



(1) You can get minute speed changes and maintain them accurately while operating under full load.

(2) All-metal, totally enclosed—unaffected by atmospheric conditions. All vital operating parts splash-lubricated from a common housing reservoir.

(3) Easy-view speed indicator facilitates speed selection and adjustments to meet all requirements.

(4) An infinite number of positive, stepless speed adjustments may be made with manual, electric, pneumatic or hydraulic controls.

(5) Self-tooth-forming chain is made from a series of overlapping steel links. Links contain packs of hardened steel laminations or slats (shown above). Slats grip toothed wheels positively without slippage—give the speed you need at any setting.

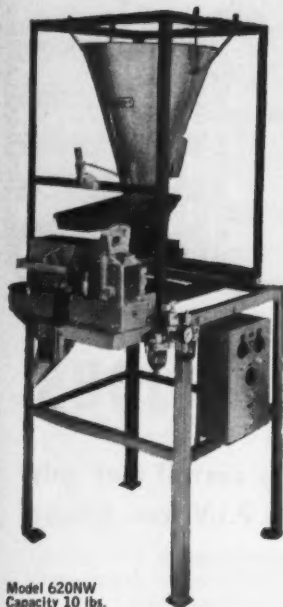
15,248

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To serve Industry There Are Link-Belt Plants, Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World.

LINK-BELT
P.I.V. VARIABLE SPEED DRIVE

Check 1240 opposite last page.

EXACT WEIGHT Automatic Net Weighing Machines



Model 620NW
Capacity 10 lbs.

**FOR PACKAGING, BAGGING,
BATCHING, COMPOUNDING**

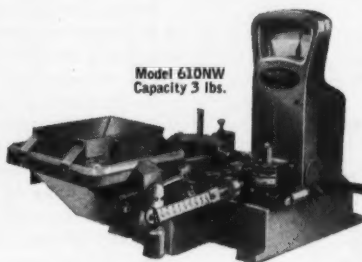
Exact Weight offers:

- Precision industrial-type scale.
- Over-under indicator visual check eliminates need for separate checkweighing operation.
- Calibrated adjustments with counterweights of known value; graduated beam, poise and scale indicator.
- Design backed by 45 years of experience in specialized weighing equipment.
- Readily accessible service and maintenance facilities.
- Performance guaranteed in writing.

Weighs and feeds any dry, free-flowing materials . . . fast and accurate operation . . . helps cut production costs. Write for Bulletin 3318 for details and specifications.

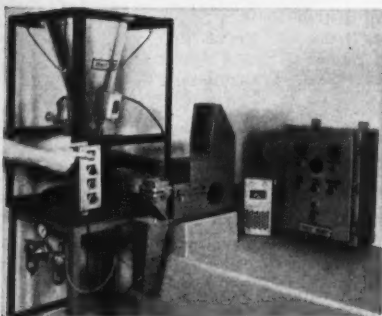
Automatic Net Weigher

Net Weigher can be supplied without the feeder machine, support frame and discharge chute. The unit may be adaptable to your specific operation. Write for Bulletin 3311.



Model 610NW
Capacity 3 lbs.

Precision Automatic Net Weighing Machine



Model 4601 NW, left, for weighing dry products with accuracies of 1/10 gram on quantities below 10 grams and one percent accuracy on quantities of 10 grams and above. Combines a high-accuracy Shadograph Scale, air-operated dump mechanism, hoppers, vibratory feeders and photoelectric controls. Models with capacities from 50 grams to 500 grams. Write for Bulletin 3363.



THE EXACT WEIGHT SCALE CO.
905 W. FIFTH AVE., COLUMBUS 8, OHIO
In Canada: 5 Six Points Road, Toronto 18, Ont.

Sales and Service Coast to Coast



BETTER QUALITY CONTROL . . . BETTER COST CONTROL

Check 1241 opposite last page.

MATERIAL HANDLING and PACKAGING



**Spencer Chemical's experiences in
ammonium nitrate packaging underscore
heavy-duty polyethylene's potential for . . .**

PROBLEM: Caking of hygroscopic ammonium nitrate fertilizer during storage and use in damp weather often makes it unsuitable for use in application equipment. A big step to prevent this is the multi-ply bag with polyethylene-coated inner ply.

But Spencer Chemical Company, a major ammonium nitrate producer, found that even this type of bag, when filled, had to be stored in a dry place and protected from the elements to give full protection against moisture pick-up and caking. This is particularly difficult since fertilizer is most often applied during wet seasons.

Solution: As early as 1955, Spencer began work on development of a waterproof polyethylene bag to handle the job.

Outcome was a simple, heavy-duty polyethylene bag—a seamless tube with a 10-

mil wall, heat-sealed across the bottom, filled, and then heat-sealed across the top. Optimum fill was determined to be 50 lb. (Some ammonium nitrate was already being packaged in 50-lb multiwalls at this time.)

Spencer fabricated some of its own bags for the first commercial test shipments in 1956, but Chippewa Plastics Company, Inc., Chippewa Falls, Wis., was the major supplier.

Shipping and marketing tests providing successful, Spencer began shipping a substantial quantity of the fertilizer in the bag in August 1958. Subsequently, the bag was adopted for a portion of the company's urea fertilizer production.

Filling and Loading

There was little difficulty in fitting polyethylene into production lines geared to



Spencer ammonium nitrate filling (right) and heat-sealing (center) line delivers 50-lb bags of the fertilizer at a rate of slightly less than 24 bags/minute

◀ Fertilizer season is usually wet-weather time. Polyethylene bags shown here shed the rain, keep dampness from hygroscopic fertilizer so it won't cake up and be unsuitable for application equipment

Barring the moisture from bagged hygroscopics

handle paper bags. Initially, a 10-spout turret bag filler was installed to handle the new bags. Adaptations for polyethylene were made mainly in two areas:

First, to compensate for the polyethylene flexibility, the friction bag-holding devices on each turret were modified so the flexible bag could be inserted easier and gripped securely.

Second, bag-closing area of machine was modified to take a band heat-sealer. This modi-

fication permits use of either the heat-sealer for the plastic bag or standard sewing machine for paper.

Filling speed is slightly less than with paper bags (machine is designed for 24 paper bags/minute) because opening and hanging the bags on the machine takes a little more time. But machinery developments should compensate for this, says Spencer.

Conveying and palletizing pose no problems. Boxcar

To page 133



Empty bags have utility use on the farm. Here some of them have been sealed together to form protective equipment cover

SPROUT-WALDRON *Pointers*

for Mixing and Blending • Size Reduction • Pelleting and
Densifying • Size Classification • Bulk Materials Handling

Published in the interest of better processing by Sprout, Waldron & Co., Inc., Muncy, Pa.



One of five Sprout-Waldron Pneumatic Aluminum Bulk Trucks for handling polystyrene pellets in Cosden Petroleum's

new "curb service marketing" delivery concept. Note Cosden's modern 32,000 barrel custom refinery in background.

SPROUT-WALDRON BULK TRUCK HANDLES POLYSTYRENE PELLETS

A recent announcement by officials at Cosden Petroleum Corporation, Big Spring, Texas of a new delivery concept, "curb service marketing" is arousing considerable interest throughout the plastic industries. The revolutionary marketing plan involves a delivery of polystyrene pellets by special highway transports direct from the purchasing plant to the customer.

The key to the new concept is a group of five 28' pneumatic aluminum bulk trailer units designed and built by Sprout-Waldron. Each of these trailers has a capacity of 1,182 cubic feet which is equivalent to 34,000 lbs. of polystyrene pellets. The high powered unloading system permits delivery to the customer at the rate of 30 tons per hour. Delivery and storage in bulk cuts down on fringe expenses such as unloading, warehousing, multiple handling and contamination. Bulk storage also permits instant

inventory determination. Storage bins can be located at the most suitable point in the plant since the pneumatic unloading system built into the trucks permits delivery anywhere a pipe can be run.

Recent completion of the new polystyrene plant is said to make Cosden Petroleum the first producer able to integrate all phases in the manufacture of this basic material. Both general purpose crystal polystyrene and high impact polystyrene are being produced. The styrene monomer used in manufacturing polystyrene is produced in an adjacent plant also owned and operated by Cosden.

For more information on how Sprout-Waldron pneumatic bulk trucks may fit your application, write for Bulletin 205.

COP/102

Check 1242 opposite last page.



GAS TRANSPORTS

NOW YOU CAN MOBILIZE YOUR GAS STORES! At surprisingly low initial cost, Taylor-Wharton Gas Transports enable you to plan bulk storage for optimum flexibility. Available in capacities of 38,500 to 56,600 cubic feet, these ruggedly built units utilize storage pressure vessels made under the same controlled production methods that have made Taylor-Wharton and Harrisburg hot-drawn seamless cylinders world famous.

Each modern Taylor-Wharton Gas Transport consists of normalized seamless steel pressure vessels, inspected and tested to I. C. C. 3A-2400 specifications. The vessels are rigidly grouped and mounted on a special trailer chassis with either single or tandem axle. The transport is delivered ready for use, with tubes manifolded to a common outlet in a rear-mounted weatherproof cabinet.

You can use this transport to boost your storage flexibility — to have your gas *where* you need it, *when* you need it. For complete details, request catalog 58 today.

More than a Century in Harrisburg 24, Pa.



CYLINDERS



TUBES



FLANGES



COUPLINGS

Check 1243 opposite last page.



Designed —
to give long, trouble-free
service under normal op-
erating conditions — at
distinct savings in cost.

Check these QUALITY FEATURES—

- One-piece, all-steel, welded frame with self-cleaning base; accurately and sturdily constructed.
- Balanced, tubular steel, heavy gauge rolls with heavy cast ends which keep bearings in perfect alignment.
- Precision-type ball bearings are fully enclosed, protected and permanently lubricated.
- Double bearing seals keep grease in and dirt out.
- Interchangeable roller assemblies locked in place by clips and cotters.
- Slotted locating collars are set-screwed to heavy, fixed steel shaft; prevents excessive movement of roll assembly and serves as an additional bearing seal.
- In stock—troughers and returns for belt widths from 18" to 36" inclusive.
- Idlers can also be furnished with 35 and 45 degree concentrators.

Write for literature.

WEBSTER MANUFACTURING, INC.

Dept. C-109

Tiffin, Ohio

Offices in All Principal Cities



Check 1244 opposite last page.

CHEMICAL PROCESSING

Plastic Bags

From page 131

loading techniques were modified somewhat. Where steel banding had been used to bind paper bags loaded between door openings, reinforced glass-fiber tape is used for the polyethylene bag.

Care must still be taken to prevent bag damage from projections such as nails, splinters, broken boards. But a small puncture in the 10-mil plastic bag has less tendency than paper to develop into a big tear. Therefore, material losses are kept down to a low figure.

Results: Bag offers positive protection against dampness, so important in fertilizer packaging. But the moisture, corrosion, and contamination protection it offers should enable it to compete for other applications, where steel and fiber drums are now being used.

Farmers are finding re-use possibilities in the empty bags. Leftover seeds, grain, and other materials may be stored and kept dry in them. Sealed together, they serve as tarpaulins and machinery covers.

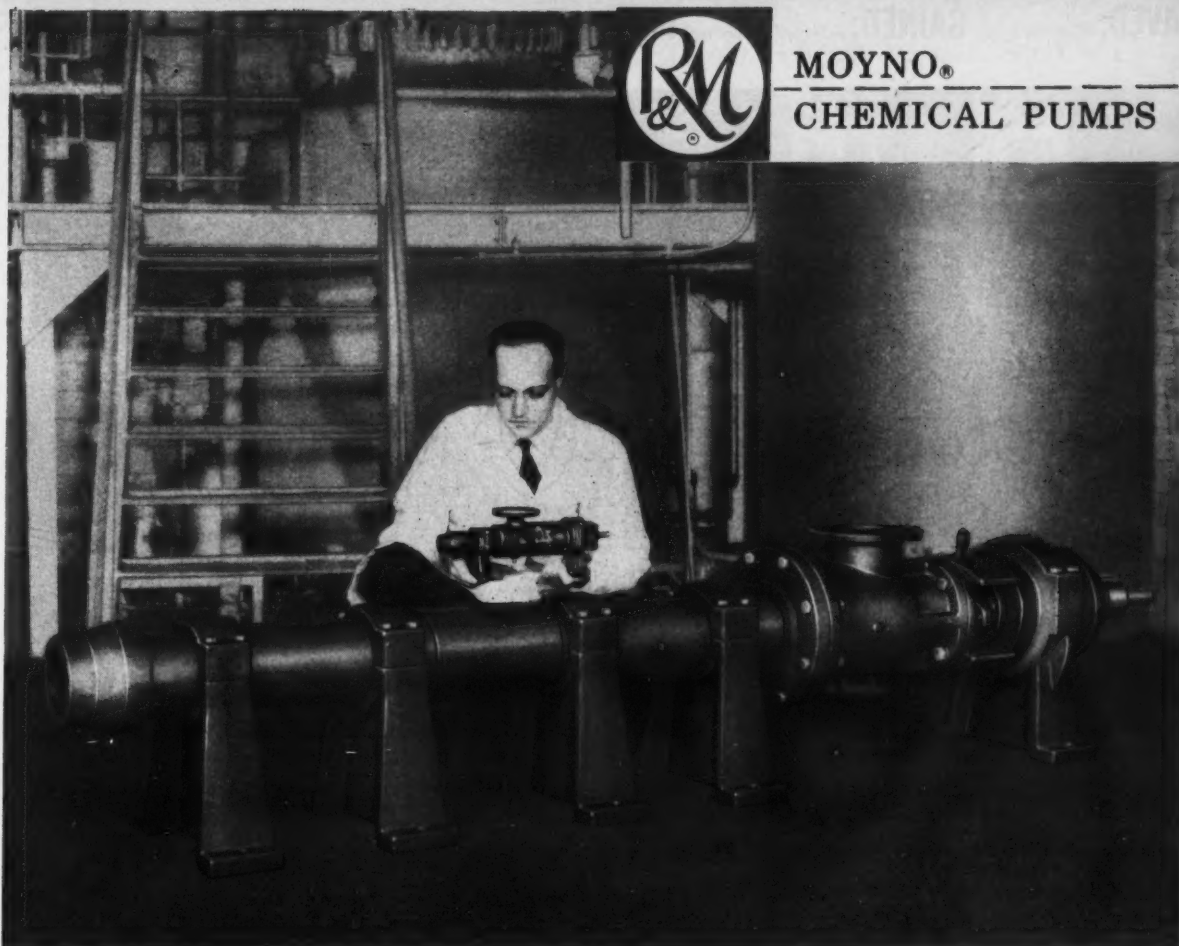
Spencer has established a strong market for the package despite the fact that they get \$1.50/ton more for the nitrate in the 50-lb polyethylene (or paper) bags than in the customary 80-lb paper bags.

(Data on polyethylene used in making these bags may be obtained from Plastics Division, Spencer Chemical Company, Dwight Bldg., Kansas City 5, Missouri.)

Check 1245 opposite last page.

(More information on the polyethylene bags may be obtained from Chippewa Plastics Company, Inc., Chippewa Falls, Wis., and from these other manufacturers known to be either producing or gearing-up to produce heavy-duty polyethylene bags: Bemis Bro. Bag Co. and Chase Bag Company, both of St. Louis, Mo.; Lamex, Inc., Norcross, Ga.; and Poly-Craft Bag Company, South Bend, Ind.)

Check 1246 opposite last page.



MOYNO®
CHEMICAL PUMPS

MOYNO® PUMPS

capacities: from 1/100 to 500 gpm
pressures: up to 1000 psi



MOYNO pumps are available in nine sizes with capacities ranging from minimum metering flow to 500 gpm and pressures from zero to 1000 psi. Positive displacement delivers uniform discharge without pulsation, agitation or turbulence. Solutions ranging from thin watery slurry to extremely viscous paste, corrosives, abrasives and even solids in suspension are economically handled without excessive pump wear.

MOYNO's unique "progressing cavity" principle with only one moving part and special resistant internal parts slashes pump maintenance costs on problem chemicals that often ruin other pumps. Almost any substance that can be forced through a pipe can be pumped by a MOYNO.

To learn how a MOYNO can cut your pumping costs, see our product information in *Chemical Engineering Catalog*, or write today for Bulletin 30 CP.



ROBBINS & MYERS, INC.

motors, household fans, Propellair industrial fans, hoists, Moyno industrial pumps
SPRINGFIELD, OHIO • BRANTFORD, ONTARIO

Check 1247 opposite last page.

SAVED: Materials Cost **GAINED:** Satisfied Customers **IMPROVED:** Sales and Profits **SPEEDED:** Automatic Packaging



Swiss Farms, Inc., Philmont, N. Y., a leading producer and packager of soils

"VISQUEEN Film's Greater Economy and Higher Quality Saves and Pays"

"VISQUEEN film reduced our packaging material costs considerably below paper and cellophane. VISQUEEN film's matchless machinability speeded our packaging production rate from 1000 bags per 24 man hours to 1500 bags per man hour! And losses due to breakage of bags has been practically eliminated. VISQUEEN film increases the quality of our finished product and decreases the price.

"In addition," says Swiss Farms, "VISQUEEN film—unlike cello—does not deteriorate after exposure to ammonium nitrate produced by the humus. Paper was opaque: customers could

not see the product. Cello ripped on the packaging machine. And distributors complained of bags breaking and rotting on the shelf. VISQUEEN film solved both of these critical marketing and packaging problems.

"We tried other poly, but none compares with VISQUEEN film for *absolute uniformity of thickness*. And, besides the excellent printability of VISQUEEN film, we enjoy *efficient service* from our VISQUEEN film suppliers: Milprint, Inc., and Nashua Corporation."

Automatically . . . it's VISQUEEN film.

YOU CAN PACKAGE ALMOST ANYTHING BETTER FOR LESS—WITH "VISQUEEN" FILM: THE FIRST AND FOREMOST POLYETHYLENE



PLASTICS DIVISION
VISKING COMPANY Division of
6733 W. 65th St., Chicago 38, Illinois
In Canada: **VISKING COMPANY DIVISION OF UNION CARBIDE CANADA LIMITED**, Lindsay, Ontario.
VISKING, VISQUEEN and UNION CARBIDE are registered trademarks of Union Carbide Corporation.



HANDLING & PACKAGING

Straddles flatcar to stack, remove cargo containers

Uses: Carrying and tying freight containers used in containerized shipping. Will stack or remove containers two-high on railroad flatcars or flat-bed highway trucks.

Features: Can drive straddle-fashion over string of flatcars to pick up and remove container from a middle car. Can lift a container from its bottom or top.

Description: Present model handles containers measuring 8' high, 8' wide, and 24' long. With slight modification it will carry containers 4 to 9' high and 8 to 40' long.

Stacking is done through hydraulic-mechanical lifting mechanism. Four hydraulic



Carrier here demonstrates ability to carry 25-ton freight container over loaded highway trailer

cylinders, two on each side, provide lift power to crane-like hoisting unit atop carrier. The carrier has six wheels, four front and two rear—all individually sprung on coil springs. Hydraulic vacuum-powered brakes operate on all wheels. Six-wheel power steering is standard.

Drive power comes from a six-cylinder Hercules gas engine coupled with heavy-duty torque converter and a transmission with five speeds forward and reverse.

Wheelbase (from center rear wheel to point midway between two front wheels) is 201". Overall height is 236", width 155", length 442". Inside turning radius is 183", outside radius 363", minimum intersecting aisle 240".

(Series 500 Van Carrier is a development of Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.)

Check 1249 opposite last page.

Check 1248 opposite last page.

GAYLORD PLAYS PROGRESSIVE WHEN IT COMES TO PACKAGING

Whether you want a new variation on an old favorite, or a "way-out" box, Gaylord has the experience and vision to compose containers that waltz through your packaging operation.

Be sharp . . . stay in the key of G. Ask your G-Man to sit in on your next packaging session, and watch him harmonize.



For
more information
on product at
right, specify 1250
see information
request blank
opposite last page.



GAYLORD
CONTAINER CORPORATION



HEADQUARTERS, ST. LOUIS
PLANTS COAST TO COAST

DIVISION OF **Crown Zellerbach Corporation**



V
N
C

C
1
5
6
XU

HANDLING & PACKAGING

Tough polyethylene bag

... for industrial use is available in limited quantities for testing by prospective users. It has a six-mil wall thickness but will handle jobs now taking a 10-mil wall. Resistance to puncture and snagging is reported to be better. The reduction in gage should permit an appreciable reduction in bag cost, says the manufacturer.

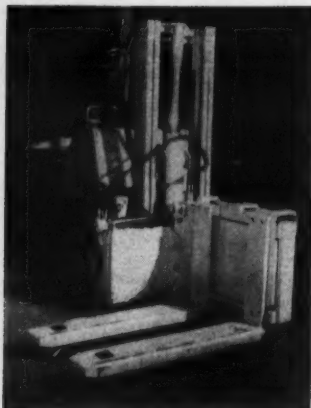
(Six-mil polyethylene industrial bag is a development of Chippewa Plastics Company, Chippewa Falls, Wis.)

Check 1251 opposite last page.

Side-transfer system ups storage space as much as 60%

Attachment fits on standard counterbalanced fork truck

Uses: Primarily for warehousing operations, but can also be used for handling on production floors where aisle space is limited.



Side-transfer attachment eliminates need for truck to circle 90° when leaving or picking up load

Features: Since truck can pick up or discharge loads in aisles only inches wider than load width, system can cut wasted aisle space 50% and more, increasing storage capacity up to 60%. Side-transfer attachment is adaptable to any modern standard counterbalanced fork truck.

Operator has perfect view

Announcing

AN ENTIRELY NEW
LINE OF V-BELT DRIVES

NEW HIGH CAPACITY!

NEW SMALL SIZE!

MANY NEW SAVINGS!

Dyna-V is entirely new. In every detail, Dyna-V has been engineered to take advantage of today's great improvements in belt materials and metal alloys—resulting in V-belt drives that are sensationally compact.

Dyna-V is capable of handling up to three times as much horsepower in a given space. Dyna-V opens vast new possibilities for better, more economical machine design. And, in most instances *Dyna-V costs less!*

An entirely new high in strength and horsepower capability is packed into Dyna-V Belts. Cross section dimensions are substantially reduced—top width is much narrower. Dyna-V Sheaves are designed for these belts. Narrower grooves reduce face width—and weight. Costs are lowered. Smaller diameter sheaves and shorter center distances multiply savings.

Increased sheave strength for increased capacity is obtained through changes in design that utilize the full benefit of modern improvements in alloy metals. Dodge is noted for the superiority of its semisteel castings, to which now have been added ductile iron castings produced with the most modern electric furnace facilities.

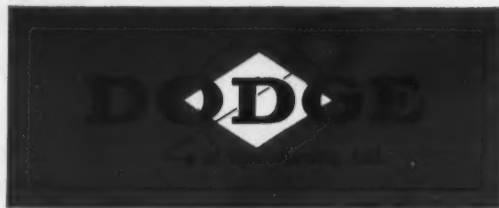
Dyna-V Sheaves are equipped with Taper-Lock Bushings. The superiority of this mounting, patented by Dodge, is widely recognized. Taper-

Lock's holding power is terrific, yet it is "easy on, easy off." And Taper-Lock Bushings provide the additional advantage of interchangeability.

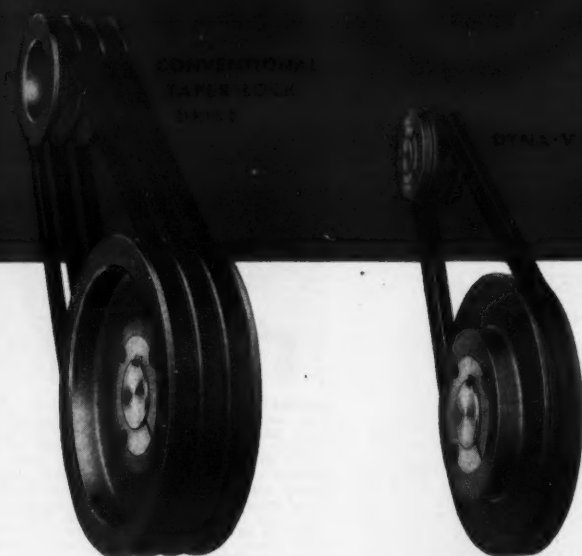
The benefits of Dyna-V go beyond compactness and initial low cost. Smaller sheaves reduce shaft overhang—increase bearing life. The dimensional stability of Dyna-V Belts (which are heat resistant, oil resistant, static conducting) solves the problem of belt matching. Every belt carries its full share of the load. The crowned top of Dyna-V Belts is a new concept in belt design. Combined with proved concave sidewall construction, it insures perfectly even load distribution between belt and sheave.

Write to us for the Dyna-V Bulletin which includes complete description of these new drives, selection tables, horsepower ratings, etc. Or see your local Dodge Distributor.

DODGE MANUFACTURING CORPORATION
6200 Union Street, Mishawaka, Indiana



DODGE Dyna-V



Dyna-V Drives for capacities up to 50 hp use the new "3V" belt cross section and Dyna-V Sheaves to match. Dyna-V Drives for capacities up to 200 hp use the new "5V" belts and sheaves. Both sizes available from Dodge distributors' stocks. Larger sizes up to 1500 hp with "8V" belts and sheaves can be furnished on order.

Dodge continues to manufacture the conventional Taper-Lock Sheaves using industry's standard A, B, C, D and E cross section belts, the hp ratings of which have been increased an average of 40% without any increase in cost.

COMPARISON, ILLUSTRATED ABOVE — 3 HP, 1750 RPM, 2.41 TO 1 RATIO

	BELTS		SHEAVES			CENTER DIS- TANCE	HP	WEIGHT (LBS.)	COST	
	Number	Size	O.D. Driver	O.D. Driven	Width				Per hp	Per Drive
CONVENTIONAL TAPER-LOCK DRIVE	3	A42	4.15"	8.95"	2½"	12.3"	4.62	24.7	\$5.62	\$25.98
DYNA-V TAPER-LOCK DRIVE	2	3V400	3.35"	8.00"	1¾"	10.8"	5.0	18.0	\$4.50	\$22.50
% SAVING <i>Savings vary with different sized drives</i>			19%	10%	56%	12%	+	27%	19.9%	13.4%

CALL THE TRANSMISSIONEER — your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look in the white pages of your telephone directory for "Dodge Transmissioneer."



Check 1252 opposite last page.

HANDLING & PACKAGING

of load during entire cycle of putting it on rack or removing it.

Description: STOW (Side Transfer Optimum Warehousing) system consists of the hydraulic attachment and racks with special load-bearing channels. Main casting of attachment is lightweight high-strength aluminum alloy.

System will handle double- or single-face pallets, using 2 x 4" stringers, up to 48 x 48". With adapters it will also handle skids or boxes. Stacking height is limited only by fork-truck lift.

Attachments come in two capacities: 2500 and 4000 lb. First is used with a 4000-lb-capacity truck; second with 6000-lb-capacity truck.

(STOW system is a development of Equipment Manufacturing, Inc., 21550 Hoover Rd., Detroit, Mich.)

Check 1253 opposite last page.

Storage-battery installation and maintenance is detailed, step-by-step, in 20-page bulletin. Intended for batteries in motive power applications, booklet covers charging methods, routine repairs, spare parts and tools for fleet operator to keep on hand. Illustrations are keyed into explanation. Form 1982 — Exide Industrial Division, The Electric Storage Battery Co., Rising Sun and Adams Ave., Philadelphia 20, Pa.

Check 1254 opposite last page.



"This practice of everyone going out for coffee at the same time has to stop!"

ERIEZ

ALL NEW

"Series 16" permanent
**PLATE
MAGNETS**

are



Tests prove NEW "Series 16" magnets with greater magnetic strength stop tramp iron cold! New heavy duty aluminum cover increases rigidity, prevents pilferage and disassembly with subsequent loss of magnetic power. Choose from many models and strengths... optional face plates for abrasive, corrosive or sanitary uses; liquid or dust-tight applications. It's a fact: "Series 16" magnets, with 16 superior features, provide ultimate operating advantages at price of ordinary magnets!

GET 6-PAGE FACT-FILLED FOLDER. WRITE TO
Eriez Mfg. Co., 73-XB Magnet Dr., Erie, Pa.

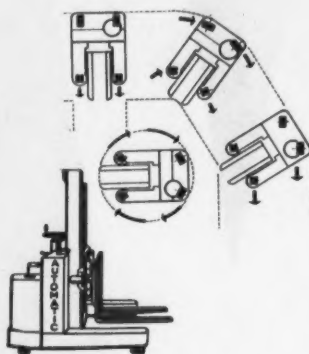


Check 1255 opposite last page.

138

LATEST INDUSTRIAL TRUCK DEVELOPMENTS

... in design, capacity,
operating features, and
accessories for improved
performance and safety



Unconventional lift truck

... with 65" overall length can turn completely around in 70" circle due to unusual steering design which permits traversing in any direction, at any angle, and with odd-shaped loads.

Forward and reverse steering and twin-drive motors are controlled by single lever. Angle and side steering are handled with steering wheel. Another lever controls reach-type fork attachment and swinging of load 30° either side of center.

Reach and swing feature simplifies placing and positioning of load. Tilt device is also available as optional feature to cradle load.

Only 43" wide, truck can operate in pallet rows, retrieving 42"-wide loads far down row. It can reach over load to pick up second load stacked behind it.

Truck travels at 5 mph with light load, 4 mph loaded. Lift speeds are 32 fpm, light; 22 fpm, fully loaded.

Uprights, power units, pumps, and reach attachment are standard truck items.

(Transveyor "Crab" truck is manufactured by Automatic Transportation Company, division of The Yale & Towne Manufacturing Company, 109 W. 87th St., Chicago 80, Ill.)

Check 1256 opposite last page.



**Aluminum mast, carriage
reduce truck weight**

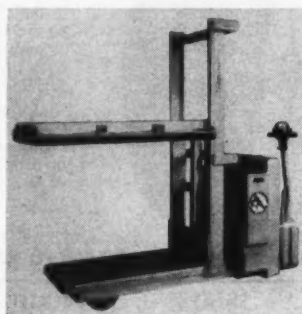
Substantial lift-truck weight reduction is achieved with introduction of aluminum triplex mast and carriage on manufacturer's Model B-224 truck.

Mast channels weigh 2/3 less than conventional units of same design. Side-thrust pressures are accommodated by use of special rollers. Components of mast are keyed and bolted, not welded.

Pilot model mast has 68" collapsed height and 137" maximum fork height. It offers free lift of 49".

(Aluminum mast and carriage design is development of Lamson Mobilift Corporation, 409 S.W. 13th St., Portland, Oregon.)

Check 1257 opposite last page.



Tipsy loads

... are stabilized with clamp attachment for low-lift walkie trucks. Clamp, surfaced with sponge-lined pads, is hydraulically operated from truck handle. Top clamp arm is adjustable for various load heights.

(Load stabilizer is made by Dept. R9-4, Lewis-Shepard Products, Inc., 125 Walnut Street, Watertown 72, Mass.)

Check 1258 opposite last page.

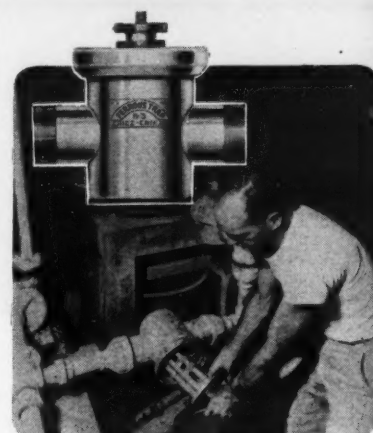
ELIMINATE TRAMP IRON

in liquid pipelines

ERIEZ

permanent non-electric
magnetic

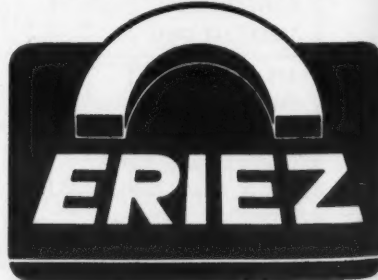
FERROUS TRAPS



ULTIMATE PROTECTION against fine iron and tramp iron contamination for most liquid-handling pipelines. Ideal for installation in food, chemical and ceramic applications. Protect product purity. Increase production. Prevent abrasive wear; reduce damage to filters, mixers, pumps, etc. Made with strong, one-piece cast bodies, Ferrous Traps withstand pressures up to 150 psi. Provide greater magnetic area than all previous models. Effective with materials up to 750°F. Quickly pay for themselves. Two types: standard stainless steel models and highly polished sanitary models.

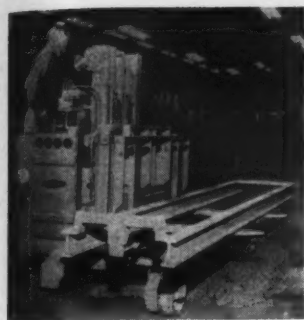
MAGNETIC STRENGTH IS GUARANTEED FOR LIFE • QUICKLY, EASILY INSTALLED IN ANY POSITION • CLEAN, SIMPLE DESIGN HAS NO MOVING PARTS • MAGNETIC ELEMENT LIFTS OUT IN SECONDS FOR INSPECTION OR CLEANING • ADAPTABLE FOR LINES FROM 1/2" to 4".

Free literature has complete installation and application information. Write today to:
Eriez Mfg. Co., 73-XA Magnet Dr., Erie, Pa.



Check 1259 opposite last page.

CHEMICAL PROCESSING

**Enclosed-spark truck**

... will operate safely in hazardous areas as it transports and stacks 3000-lb loads up to 16' wide in storage aisles 8' wide by traveling sideways. It also tiers conventionally in 6' aisles. Auxiliary 18" lift is incorporated for ceiling-high stacking with minimum collapsed height.

(Narrow-aisle electric truck is product of The Raymond Corporation, 58-173 Madison Ave., Greene, N.Y.)

Check 1260 opposite last page.

Maneuverability

... over rough terrain is feature of 3000-lb pneumatic-tired fork truck which can turn in 77" radius and climb 22% grade with full load. It will travel 11 mph forward or reverse fully loaded.

Powered by four-cylinder gas engine, truck is 87½" long (less forks); weighs 6175 lb. Directional and lift-tilt controls are on steering column. Swing-out hood exposes engine for routine servicing.

(CY-30 fork truck is product of Industrial Truck Division, Clark Equipment Company, Battle Creek, Mich.)

Check 1261 opposite last page.

Electric fork truck for low-head-room areas is pictured in operation in four-page bulletin. Specifications and engineering drawings of the 2000-lb-capacity unit are included. Model F-48T2 Bul — The Elwell-Parker Electric Company, 4205 St. Clair Ave., Cleveland 3, Ohio.

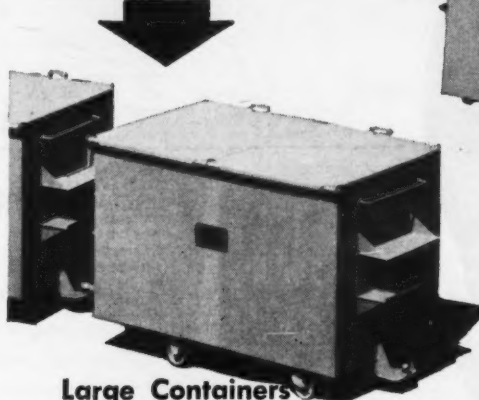
Check 1262 opposite last page.

cut disposal costs by two-thirds...

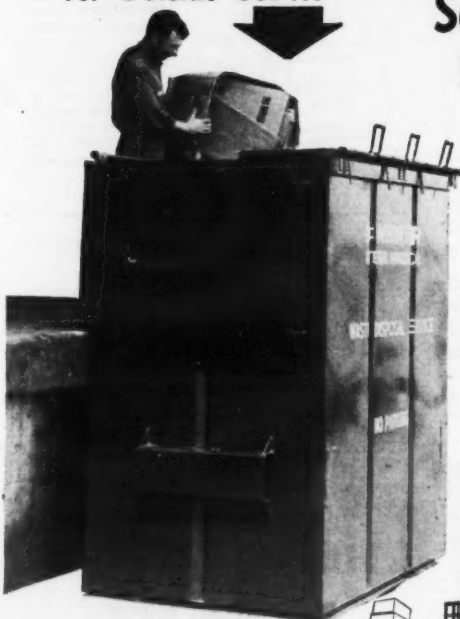
Containerize Waste as it Accumulates...

Patents Pending

Small Tracking Containers for Indoor Use...



Large Containers for Outside Use...



Mfd. By
DEMPSTER BROTHERS
Inc.



Self-Loading DEMPSTER-DUMPMASTER Handles 6 Sizes of Containers...

If you're using boxes, bins, cans or carts to handle or store big-volume waste and refuse, you can reduce costs by more than two-thirds with the new DEMPSTER-DUMPMASTER System of waste storage and collection.

One Dumpmaster serves any number of detachable metal containers placed at waste accumulation points. Making its rounds, the Dumpmaster picks up each container, in turn, empties the contents into its packer body and compresses the material to a fraction of its former volume assuring big pay loads on every trip to the disposal area.

The DEMPSTER-DUMPMASTER is economical! One man operation. It's safe! Clearance lifting arms never pass the cab windows, can't injure operator. Containers can be used indoors or outdoors, on ground, below grade or on a dock.

This system is also available on a monthly fee basis through a nearby DEMPSTER-DUMPMASTER equipped private hauler, (name furnished on request).

WRITE TODAY FOR FREE BROCHURE

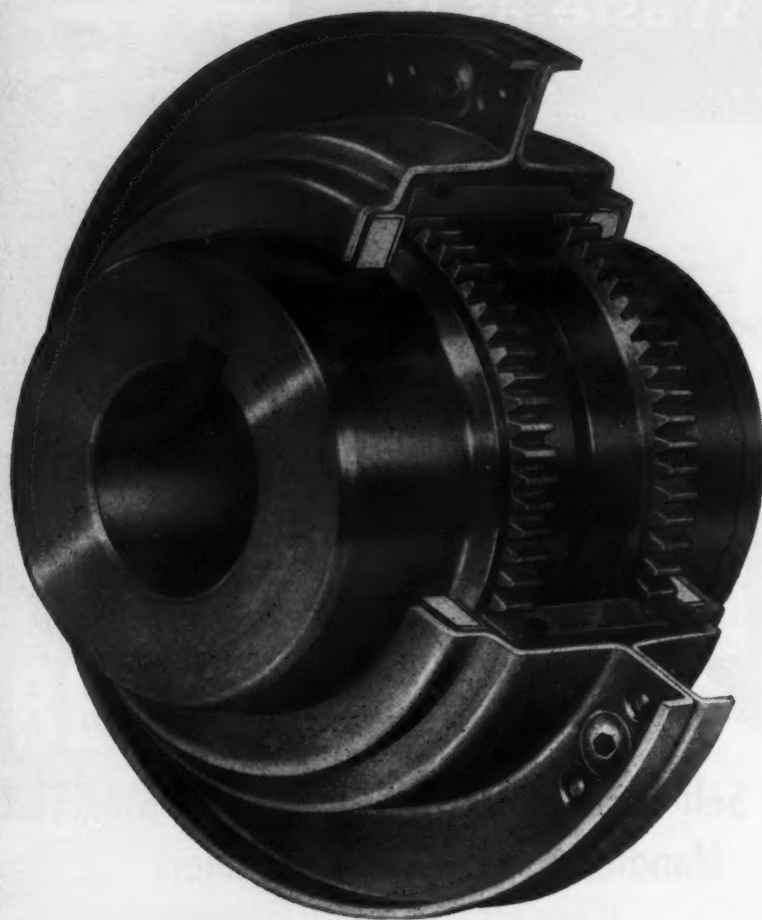
DEMPSTER
SYSTEMS



Dept. CP-10 DEMPSTER BROTHERS, Knoxville 17, Tennessee

Check 1263 opposite last page.

None better at any price



LINK-BELT MOTOR COUPLINGS are priced low among high-quality flexible couplings

You're further ahead in every way with Link-Belt Motor Couplings . . . the most economical, best performing partners for motor-driven pumps, compressors, speed reducers, generators and similar equipment.

And low price is only the first saving! You save more in installation and maintenance. Quick-acting spiral cam fasteners assure fast, easy assembly . . . permit servicing in a fraction of the time required with couplings using bolts.

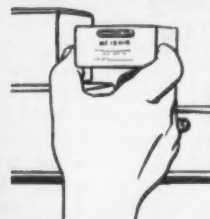
High capacity and durability are embodied in the geared design.

Torque transmitting parts are fully and accurately machined from cold-rolled steel. Especially important, compensation for both angular and parallel misalignment is FREE—i.e., without imposing loads on shafts and bearings.

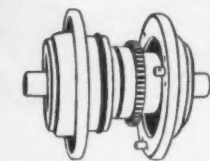
Folder 2875 has complete details. Contact your nearest Link-Belt office or authorized stock-carrying distributor.



FAST, EASY ASSEMBLY AND DISASSEMBLY! Allen head, spiral cam fasteners which open and close with only a quarter turn are a permanent part of the cover . . . no loose nuts or bolts to get lost!



OFF-THE-SHELF AVAILABILITY! Link-Belt's full coverage of ground-finished bores from 1/2" to 2 1/2" assures immediate delivery from stock . . . eliminates time and cost of re-boring.



EASY OPENING ASSURES EASY SERVICING! It takes only seconds to see if relubrication is needed or if equipment needs to be realigned. Trouble can be detected in advance, shutdowns avoided.



NO NEED FOR LARGE INVENTORY! Components are separately cartoned . . . a few cover and sleeve assemblies plus the required assortment of hubs with finished bores will cover all requirements.



NEW CORROSION-DUTY COVER! Provides positive protection against damaging effects of corrosive attack. Construction includes stainless steel fasteners and polyester fiber seals.

LINK-BELT

GEARED FLEXIBLE COUPLINGS

HANDLING & PACKAGING

Lifts, dumps 3000 lb at heights to 50 ft

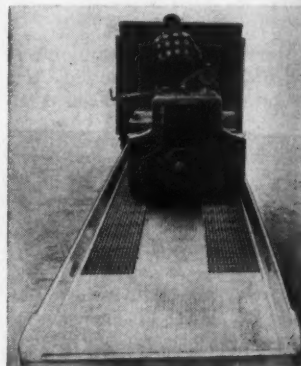
Uses: Lifts and dumps complete in-plant bulk trucks. Designed for batch loading of mixing, grinding, and pulverizing equipment, kettles, other process equipment.

Features: Although of standardized design, unit can be varied to accommodate almost any size truck as well as variety of containers.

Description: Available in capacities to 3000 lb and lifts to 50 ft.

(Bulk-truck dumper is product of Conveyors and Dumpers, Inc., PO Box 567, West Caldwell, N.J.)

Check 1265 opposite last page.



Grating tracks

. . . in mobile magnesium loading ramps prevent slip that could be a problem when oil, grease, mud, water, snow, or ice build up. Of heavy-duty open construction, tracks are recessed in deck surface to set flush with center flooring.

Ramps come in 58 and 70' widths, 30 and 36' lengths, and capacities from 11,000 to 16,000 lb. Curb is 4 1/2" high.

(Ramps are product of Magline, Inc., 1900 Mercer St., Pinconning, Mich.)

Check 1266 opposite last page.

Coil holders for uniform-feed stitching machine are presented in four-page Folder AD 303—Acme Steel Company, 135th St. & Perry Ave., Chicago 27, Ill.

Check 1267 opposite last page.

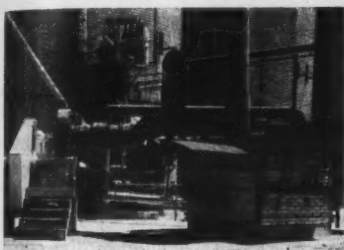
LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarborough (Toronto 13); South Africa, Springs. Representatives Throughout the World.

15, 152

Check 1264 opposite last page.



PROCESSING EQUIPMENT



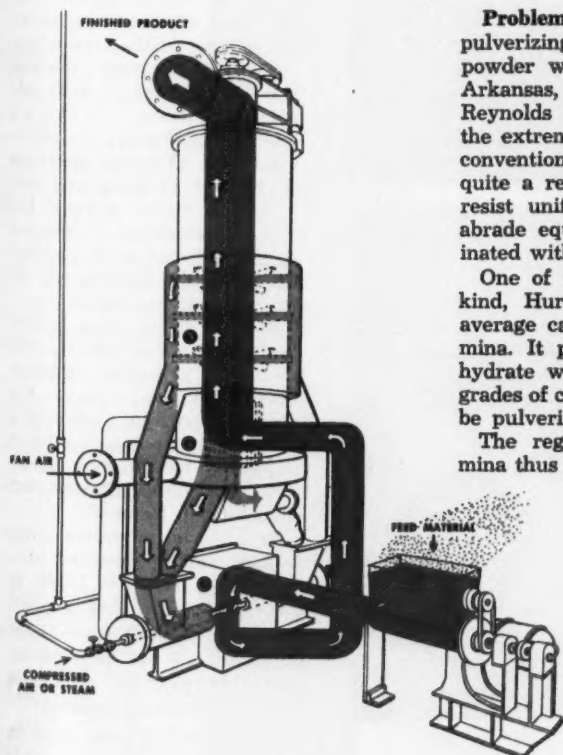
Gas-fired heater, at right, furnishes 700° F steam to pulverizer (shown in center background). Air is provided by blower at left

Alumina is screw-fed, at right, into bottom of jet pulverizer (center). Pipes at left carry superheated steam and fan air to unit



Superheated steam pulverizes 12,000 lb alumina per hr

Efficient grinding system at Reynolds Metals operates on fluidized solids principle, reduces particle size from 75 down to 5 microns



Problem: A better, less costly way of pulverizing calcined alumina into fine powder was needed at the Bauxite, Arkansas, Hurricane Creek plant of Reynolds Metals Company. Processing the extremely hard, abrasive material in conventional grinding equipment can be quite a real headache. Particles tend to resist uniform reduction to finer sizes, abrade equipment, and become contaminated with iron.

One of the biggest installations of its kind, Hurricane Creek has an annual average capacity of 750,000 tons of alumina. It produces a purified aluminum hydrate which is calcined to make two grades of coarse product. These must then be pulverized to a fine powder.

The regular metallurgical-grade alumina thus produced is processed at other

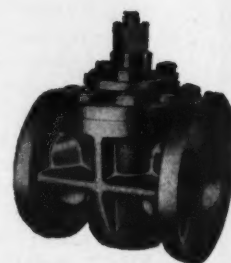
Grinding system consists essentially of two sections, pulverizing zone (1) and classification section (2). Classifier blades (3) knock out oversize particles

NEW!

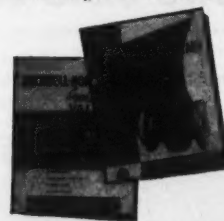
Rockwell-Nordstrom COATED VALVES

For Longer Valve Life, Lower Cost On Corrosive Services

New coatings applied to Rockwell-Nordstrom iron and steel lubricated plug valves assure the performance of more costly metals usually needed on highly corrosive services. *Kanigen*¹ coatings effectively resist corrosion on services where nickel or expensive alloys are usually required. *K-51*: "Penton"² coatings stop corrosion by acids, caustics, brines and most organic solvents.



SEND FOR FREE LITERATURE . . . get complete facts on how you can have better valve service at lower cost.



Write for complete details on the world's most complete line of lubricated plug valves, plug valve lubricants and accessories: Rockwell Manufacturing Company, Pittsburgh 8, Pa. Canadian Valve Licensee: Peacock Brothers Limited.

- (1) Applied by General American Transportation Corporation.
- (2) (3) K-51 Penton and Whirlclad are patented by National Polymer, Inc.

ROCKWELL-Nordstrom VALVES

another fine product by

ROCKWELL



Check 1268 opposite last page.

Reynolds' plants into aluminum. The other, ceramic-grade alumina, is sold to manufacturers of inks, paints, plastics, glass, abrasives, and those products using alumina to impart hardness or high heat resistance.

Solution: A grinding system was installed that uses high velocity streams of superheated steam to pulverize the product. Known as a Majac jet pulverizer, equipment is ceramic-lined and has no moving parts in its grinding chamber.

Machine consists of two sections (see drawing), a pulverizing zone (1) and a classification section (2). In pulverizing zone, 75 micron-size alumina fed into unit, is impacted against itself while entrained in two directly-opposed, streams of steam. Steam is heated in nearby gas-fired furnace to 700°F and fed to nozzles at rate of 5600 to 6000 lb per hr, at 85 psi.

Product is then carried upward to classifier by the steam and strip air which is added at 3480 cfm and 140°F. At velocity fixed by this quantity of air, grossly oversize particles cannot be carried upward, so they drop back into pulverizing zone for further reduction.

Those that have reached final desired size (1 to 5 microns) continue through classifier blades (3) to collection point. Oversize particles are thrown to periphery and return to steam nozzles for further reduction. Pulverizer can be adjusted while operating to change particle size of end product, as needed.

Similar units, using either compressed air or steam, may be used to pulverize materials other than alumina. Air grinding permits processing low-melting point products, difficult to handle by conventional apparatus. Refrigerated air may also be used.

Results: In operation since August 1958, pulverizer produces from 10,000 to 12,000 lb per hr of one to five micron, high-purity alumina. At times it has turned out as much as 13,800 lb per hr, which is 175% of its rated capacity.

Absence of moving parts in
To page 144

Who cares about your Wire Cloth Fabrications?

CAMBRIDGE does . . .

that's why you automatically get service with your order . . . whether you need dozens of midget strainers or a single giant-sized retaining screen.

Careful, competent workmanship and constant inspection assure you of quality . . . modern machinery and accurate scheduling assure you of prompt delivery. And, a Cambridge Field Engineer follows up your order to make sure our product is giving you the best possible service. Let us quote on your next order for wire cloth fabrications. We manufacture wire cloth from any metal or alloy—including titanium—in nine basic weaves. We'll work from your prints or draw up prints for your approval. Call your Cambridge Field Engineer . . . he's listed in the yellow pages under "Wire Cloth". Or, write for FREE 94-PAGE CATALOG.

The Cambridge Wire Cloth Co.

Department F • Cambridge 10, Md.

Manufacturers of Wire Cloth,
Metal-Mesh Conveyor Belts, Wire Cloth Fabrications



Check 1269 opposite last page.

THAT'S
INTERESTING

Hic!

The art of bartending may suffer from this one. It has been suggested that martinis be encapsulated for eating like popcorn. Of course, one of the advantages would be to silence the wise guys who ask, "Hey, have you got a drink in your pocket?"

Engineering 'Girl Fridays'

Twenty-three "Girl Fridays" were graduated recently from the Pittsburgh Business Training College's Engineering secretarial course.

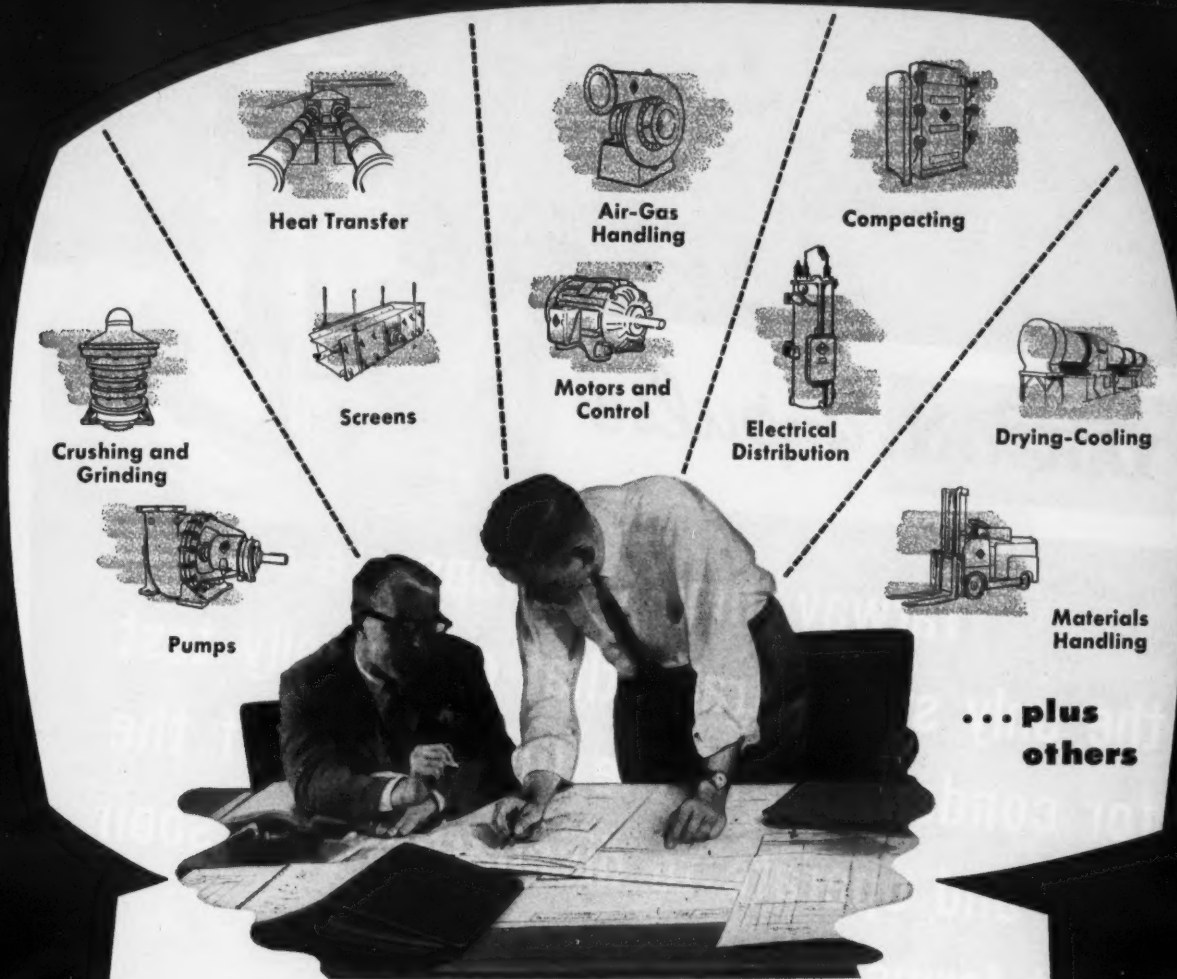
They were trained to speak the engineers' own language, handle technical dictation and transcription through mastery of a special engineering shorthand, initiate experiments and research in various fields, and serve as an engineer's administrative aid.

For more information on product at right, specify 1270 see information request blank opposite last page.



SCOPE of
PRODUCT LINES from...

ALLIS-CHALMERS



... plus
others

ONE man can provide all this "teamed" equipment

He's your Allis-Chalmers representative. *One inquiry* to him and much of the equipment for any process expansion or modernization is available.

Time and money-saving advantages of this single source are obvious. Further, you're assured of "teamed" equipment, engineered by A-C chemical industry specialists. And, once installed, this equipment continues to be backed by outstanding field service.

ASK "THE MAN" about the tremendous scope of A-C equipment for petro-chemicals... equipment that's built for the finest quality control. Or write Allis-Chalmers, Milwaukee 1, Wisconsin.

Products for Petro-Chemicals: *Electrical Generation, Distribution and Utilization Equipment; Pumps (rotary vacuum and centrifugal); Mechanical Power Transmission Equipment; Processing Machinery (mills, kilns, screens, etc.); Water Conditioning Systems, plus Materials Handling Equipment.*



A 5983 C

Jet Pulverizer

From page 142

pulverizing chamber, coupled with unit's ceramic lining, makes product contamination negligible (only one ppm iron pickup during pulverizing). Pneumatically moving material to collection point further speeds processing by eliminating need for extra handling.

Results have been so satisfactory that the research department of the plant has installed a small pulverizer in its pilot plant. Unit is used to develop new grades and applications of fine aluminas.

(Majac jet pulverizers are product of Majac Inc., Twenty-third Street, Sharpsburg, Pittsburgh 15, Pa.)

Check 1272 opposite last page.

(Further information about ceramic-grade alumina may be obtained from Reynolds Metals Company, 2591 South 3rd Street, Louisville 1, Ky.)

Check 1273 opposite last page.

**Faster, better drying
with agitating device
on conical dryer**

Breaks up agglomerates,
speeds heat transfer

An agitating device designed to extend applications for conical-shaped dryers has been introduced by manufacturer. Known as the Conagator, device permits agglomerative ingredients to be broken up quickly, with drying proceeding uniformly and with high heat transfer. Device reportedly permits the equipment to process wide range of materials which were previously considered difficult or impossible to vacuum dry effectively.

Agitator consists of drive elements and four intermeshing stainless steel blades. Mounted in one of the apexes of the dryer, unit operates by a constant-speed motor and is used only when required. Agitator does not interfere with the normal operation of dryer.

It is estimated that solids

ONLY ONE MOVING
PART, A SMALL
STAINLESS STEEL
PISTON TYPE VALVE

impulse®

Yarway Impulse* Traps are
the only steam traps that continually test
for condensate in the line ahead of the
trap and operate to discharge it as soon
as it forms.

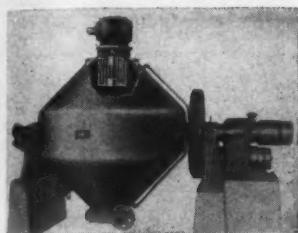
You gain by higher temperatures,
steadier temperatures, peak operation of
steam heated equipment at all times.

* A COMPLETE LINE OF STEAM TRAPS, ALL OPERATING ON A PROVEN THERMODYNAMIC PRINCIPLE
Manufactured by YARNALL WARING CO., 125 Mermaid Avenue, Philadelphia 18, Pa.
Stocked and sold by 270 Industrial Distributors
Write for free Bulletin "The Way and How of Steam Trapping"

Check 1271 opposite last page.

and liquids tend to form balls in 15% of dryer's applications. This occurs for products with fine particle size (less than one micron) and with some soluble components.

Agitator not only breaks up balls, but also cuts drying cycle, since fines achieve better contact with heat transfer



Mounted in one of the apexes of conical dryer, agitator operates on constant-speed motor and is used only when needed

surface. Fine particle dye-stuffs have reportedly been dried in half the previous time. When dispersing agglomerates, the device speeds removal of odors.

(Further information about the Patterson Conagator may be obtained from the Patterson Foundry and Machine Company, Division of Ferro Corporation, East Liverpool, Ohio.)

Check 1274 opposite last page.

Combination filter frame holds air cartridge, charcoal unit

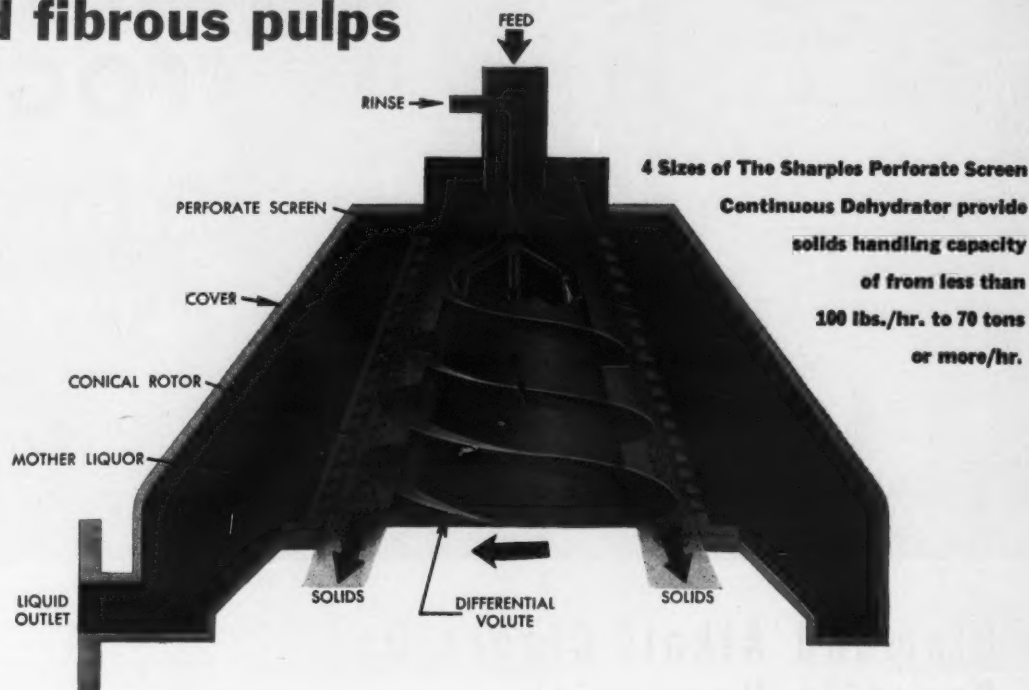
An improved filter frame has been developed to provide a compact filter bank for both dust and odor removal. Upstream portion of frame holds standard 12"-deep filter cartridge in choice of 95, 85, or 35% discoloration efficiency on atmospheric dust.

Downstream end is designed for easy installation of an activated charcoal filter. Frame has 1000 cfm capacity, is made of steel, and measures 24 x 24 x 21" deep.

(Combination Aerosolve filter frame was developed by Cambridge Filter Corporation, 738 East Erie Blvd., Syracuse 1, N. Y.)

Check 1275 opposite last page.

flexibility for deliquifying crystalline solids and fibrous pulps



THERE ARE WIDELY DIFFERENT BENEFITS to be derived from the Sharples Continuous Dehydrator, depending on the product.

Dewatering high concentration sodium chloride and potash . . . processing starch or other fruit and vegetable products containing fibrous solids . . . deliquification of organic crystals that must not be changed in size or shape . . . each of these typical yet widely different applications makes use of the fact that the Continuous Dehydrator combines the *separating action* of high centrifugal force, the *filtering action* of the replaceable screen, and the *metering action* of the differential volute.

This combination of forces applied to certain slurries is ideal. The ability to change screen size and vary rotational speed as desired, and the gentle, controlled action of the differential volute are additional advantages for processing flexibility.

THE SHARPLES CONTINUOUS DEHYDRATOR, available in four sizes, including the Model 510 with solids handling capacity of 70 tons per hour or more, supplements the well-known line of Sharples Centrifuges for deliquifying solids.

Write today for literature about the advanced design Sharples Continuous Dehydrator.



A Typical battery installation of Continuous Dehydrators

SHARPLES CORPORATION
Centrifugal and Process Engineers
2300 WESTMORELAND STREET / PHILADELPHIA 40, PENNSYLVANIA
NEW YORK • PITTSBURGH • CLEVELAND • DETROIT • CHICAGO • HOUSTON • SAN FRANCISCO • LOS ANGELES • ST. LOUIS • ATLANTA
Associated Companies and Representatives throughout the World

Check 1276 opposite last page.



IN A
"FOG"
ABOUT
FILTERS?

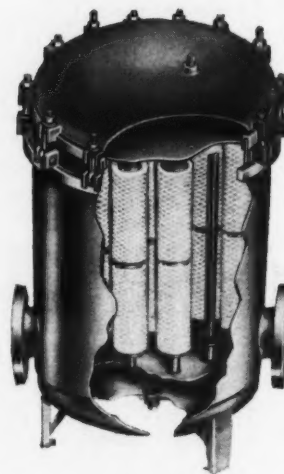
Diamond Alkali Clears Up Paraffin Haze with *Fulflo Filters*

If you're in a fog about filters—or product impurities—take a tip from Diamond Alkali. This leading chemical producer achieves gleaming cleanliness of liquid chlorinated paraffins by a final polishing operation with low-cost Fulflo Filters. Highest quality product standards are maintained.

Diamond's liquid chlorinated paraffins have 30 to 150 poise (Brookfield) viscosity, and are clarified at a flow rate of 200-400 gph. Fulflo Filters are available in a wide range of models for high or low flow rate, viscosity, pressure, pH and temperature. They provide continuous micro-clarity, by true *depth* filtration, for all types of chemicals, oils, water, and other industrial fluids.

Write for technical literature or engineering assistance
to Department CP.

- These two Fulflo Filters, each with
- 110 Honeycomb Filter Tubes, re-
- move micron particles which
- were causing haze in chlorinated
- paraffin produced by the Chlorin-
- ated Products Division of Diamond
- Alkali Company.



COMMERCIAL FILTERS CORPORATION
MELROSE 76, MASSACHUSETTS

PLANTS IN MELROSE, MASSACHUSETTS AND LEBANON, INDIANA

MICRO-CLARITY AT MINIMUM COST



with genuine Honeycomb Filter
Tubes for controlled micro-
clarity of industrial fluids.



Selective filtration of oils • water-oil
separators • magnetic separators •
pre-coat filters • coolant clarifiers •
automatic tubular conveyors.

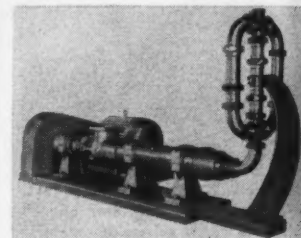
PROCESSING EQUIPMENT

**Ultrasonic homogenizer
operates at 22,000 cps,
handles 9000 gph**

Uses: Homogenizing various
liquids and emulsions.

Features: Ultrasonic ho-
mogenizer can handle up to
9000 gph, operates at about
22,000 cps.

Description: Power input
for machine is 30 hp, 220/440



Ultrasonic homogenizer can be
used in large scale, high-volume
operations

volts, 60 cycles. Material to be
emulsified impinges in the
form of flat, high-pressure jet
stream on edge of blade which
vibrates at high frequency.
Cavitation takes place contin-
uously in stream rushing past
blade causing violent pressure
changes within resonant bell.

(Further information about
Hydrasonic ultrasonic homog-
enizer may be obtained from
Sonic Engineering Corpora-
tion, 146 Selleck Street, Stam-
ford, Conn.)

Check 1278 opposite last page.

**Pressurized centrifuge
designed to operate
at 50 psi, -30°F**

Can be used where nickel
and copper shouldn't

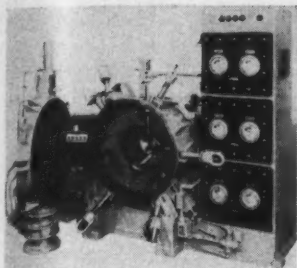
Uses: High pressure centri-
fuging operations in chemical
and allied industries.

Features: Continuous cen-
trifuge is particularly suitable
for separation processes con-
ducted around -30°F. Unit is
also recommended for appli-
cations in which construction
metals containing nickel and
copper must be avoided.

Description: Automatic,
continuous centrifuge is de-
signed and built of special
steel to operate under 50 lb

Check 1277 opposite last page.

PROCESSING EQUIPMENT



Centrifuge is designed for high pressure, low temperature applications

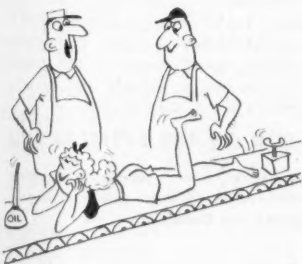
internal pressure. Unit is powered by 15 hp motor and is equipped with electrical controls for automatic operation. If desired, centrifuge can be operated manually.

Machine has an 18" diam basket which is automatically charged and discharged. Automatic leveling device for cake is also included. Mechanical seal of shaft is so arranged that it is not deflected with deflections of the housing.

Machine uses "ter meer" principles of centrifuging, combining them with an automatically-controlled system of pressurizing and depressurizing.

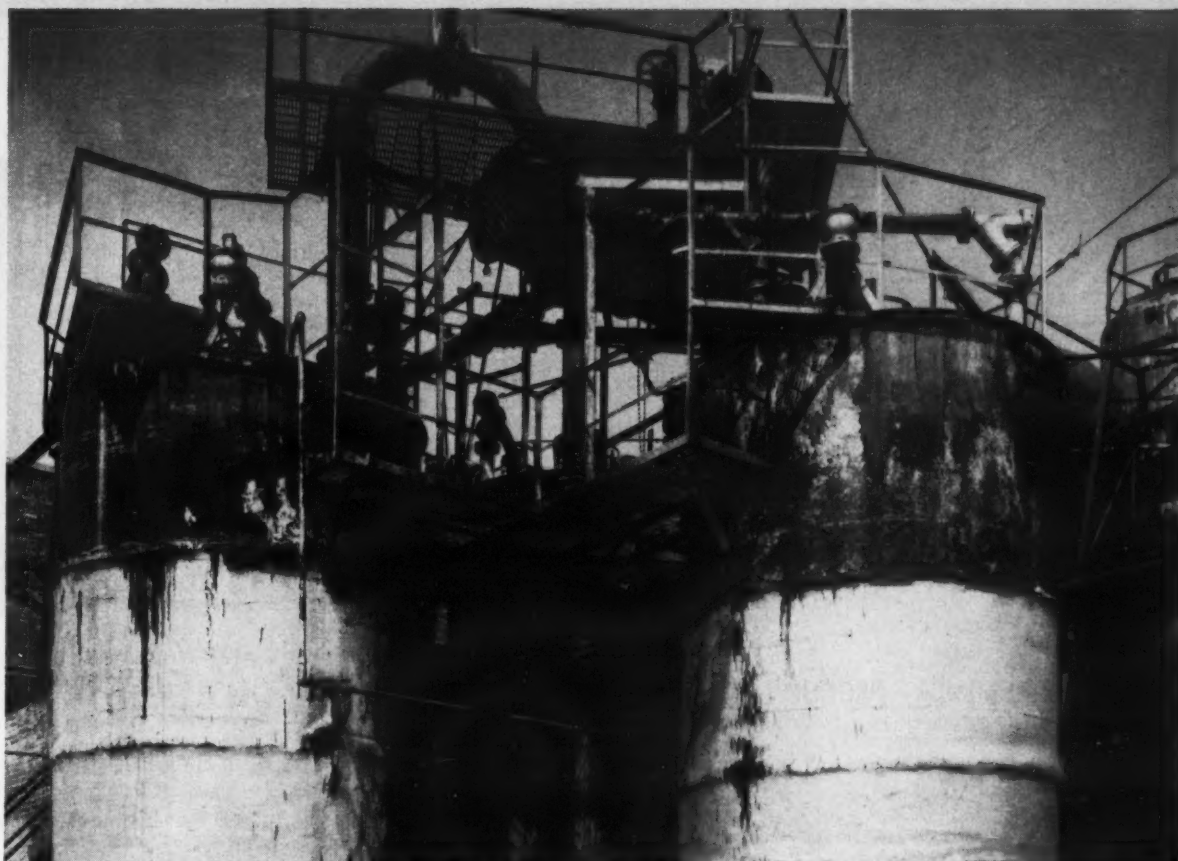
(High pressure centrifuge is development of Chemical Machinery division, Baker Perkins Inc., 1000 Hess, Saginaw, Mich.)

Check 1279 opposite last page.



-ALI-

"Goes by every hour. She alerts employees and oils motors."



at FLINTKOTE'S Chicago Heights plant:

13 years continuous operation prove advantages of TURBO asphalt oxidizers

Thirteen years ago three General American TURBO asphalt oxidizers were installed at Flintkote Company's Chicago Heights plant. The units were piped to operate either individually as batch oxidizers for special products or in series for asphalt blowing. They require less than 15 hp each, and each is capable of handling up to 1000 cfm of air. They afford a rise in the melting point of asphalt material, varying from 12 to 20 degrees per hour, depending on the type of flux being produced.

For thirteen years the units have been in continuous operation, providing advantages of low power consumption, high air efficiency and accurate control of product specification.

The Flintkote installation is typical of TURBO asphalt equipment installed during a 25 year period to give higher production rates per still, lower power costs and less down time. TURBO units are safer to operate, need less top steam and less firing because of greater heat generation in the asphalt.

Ask for a TURBO engineer to discuss application of TURBO equipment to your needs.

FOR DETAILED INFORMATION AND USEFUL DESIGN DATA, SEND FOR THE FOLLOWING BULLETINS:

Please send me the following Turbo-Mixer Bulletin (s):

General Turbo-Mixer Bulletin _____

RDC Extraction Column Bulletin _____

Process Equipment Division
TURBO-MIXERS
GENERAL AMERICAN
TRANSPORTATION
CORPORATION

135 South LaSalle Street
Chicago 3, Illinois • Offices in principal cities



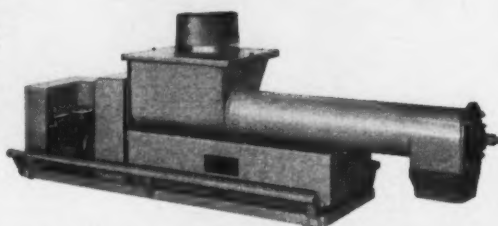
Check 1280 opposite last page.



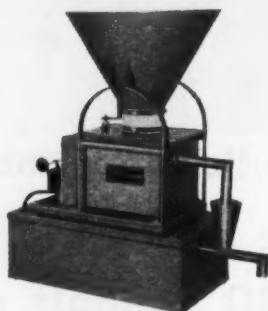
Which Bulk Feeder?



Standard Volumetric?



Feeder-Conveyor Volumetric?



Gravimetric?

Exclusive VIBRA SCREW® has ALL THREE

Now the exclusive Vibra Screw principle—combining vibrated screw rotation with vibration of hopper, trough and tube—is now available in a new gravimetric feeder and a heavy duty feeder-conveyor with the same unmatched accuracy for precise feeding of dry materials as the original VIBRA SCREW volumetric feeder.

All three are capable of handling a wide range of different and difficult substances, but each is designed to meet requirements of a specific feeding problem. Consider these facts about each one:

STANDARD VOLUMETRIC—For handling all materials, free flowing or sticky, at minute-to-minute accuracy in capacities from ounces to tons per hour.

FEEDER-CONVEYOR VOLUMETRIC—For heavy duty service in horizontal conveying as well as feeding from supply pipe or hopper at tonnage rates in screw lengths up to 20 feet.

GRAVIMETRIC—For delivering weighed batches directly into process at timed intervals in quantities down to one ounce and frequencies variable up to 4 per minute. These intermittent charges can be converted into a self-adjusting, continuous weight-controlled stream, by using a third screw which continuously rotates and vibrates.

Want more information? Write today for literature. Or better still, send us details of your dry materials handling problem.

VIBRA SCREW FEEDERS, INC.

156 Huron Avenue, Clifton, New Jersey

Check 1281 opposite last page.

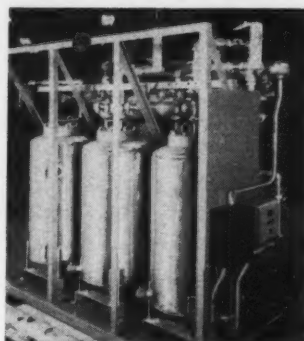
PROCESSING EQUIPMENT

Aqua at 20 million ohms produced by packaged purification system

Uses: Producing high purity water.

Features: Water purification system is capable of delivering 20 million-ohm water.

Description: System was initially designed to meet specific requirements of electronic component manufacturers who needed ultra-pure water. The packaged system operates on a closed circuit. Water taken from rinse cycle at ele-



Packaged water purification system operates on closed circuit

ated temperature is processed through temperature reduction, filtration, and ion exchange demineralization. Treated water is returned to use at original temperature.

(Further information about high-purity water purification system may be obtained from The Permutit Company, division of Pfaunder Permutit Inc., 50 W. 44th St., N.Y. 36, N.Y.)

Check 1282 opposite last page.

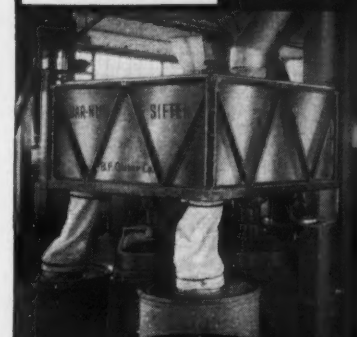
Compact mixer-disperser designed for heavy-duty, safe operation

Uses: Heavy-duty mixing applications in chemical and allied industries. Unit can be used for mixing solid propellants.

Features: Mixer is 14 ft tall and is powered with a four-speed, 20-hp, explosion-proof motor. Jacketed mixing chamber is raised by separate hydraulic system to mixing

do you
screen or
size dry
chemicals?

laboratory
pilot plant
production



Get bonus performance
with the
BAR-NUN SIFTER

Do you need to grade a material by particle size . . . screen out oversize and undersize particles . . . remove lumps or foreign materials . . . or make any type of particle-size separation? Then you want these Bar-Nun Rotary Sifter advantages:

- Accurate separations in large volume, produced in limited floor space.
- Screens totally enclosed by dust-tight, all-metal box. Optional stainless steel construction.
- Easy cleaning. Flip-action clamps permit quick opening of box, and easy removal of screens for thorough cleaning.
- Smooth, low cost operation. Exclusive, all-mechanical design and rugged construction give trouble-free performance even in continuous service on "hard-to-sift" materials.

For single or multiple separations, as fine as 325 mesh—in laboratory work or big volume, heavy duty production—you'll get bonus performance from a Bar-Nun Rotary Sifter. Users' repeat orders prove it. Write for specific details and recommendations without obligation.

SEND FOR 6-PAGE BULLETIN 503

For details on other Gump processing equipment, refer to your copy of Chemical Engineering Catalog.



FEEDING • MIXING • SIFTING • WEIGHING • PACKING
EQUIPMENT FOR THE PROCESS INDUSTRIES

B. F. GUMP Co.

Engineers & Manufacturers Since 1872
1344 S. Cicero Avenue • Chicago 50, Illinois

Check 1283 opposite last page.

CHEMICAL PROCESSING



Hydraulic system raises mixing chamber and holds it to head of heavy-duty mixer (inset)

head. Tight seal permits mixing to be performed under vacuum, if desired.

Description: Heavy-duty, vertical, planetary mixer-disperser has 250-gal, stainless steel, mixing chamber. Unit is jacketed around periphery, including bottom, to permit either cooling or heating. Chamber has allowable internal working pressure of 50 psi.

Mixing is performed by wedge-proof paddles. These consist of one stationary paddle and one rotating paddle moving on its own axis in a planetary orbit. Paddles intermesh, resulting in a continuous kneading and squeezing action between paddles, rather than mere stirring.

All bearings, gears, and other moving parts are separately located to assure maximum safety and to minimize chances of contaminating materials being processed.

(Planetary mixer-disperser is product of Bramley Machinery Corporation, 880 River Road, Edgewater, N. J.)

Check 1284 opposite last page.

NEXT MONTH

High-quality paraffin wax can be produced at rate of over 250 tons per day in facilities recently completed at Atlantic Refining Company. Filtering heart of this installation is detailed in this section next month.



For The Upjohn Company... CUSTOM-BUILT solution for a filtration problem

This FEinc rotary pressure filter was designed and built recently to specifications of The Upjohn Company, Kalamazoo, Michigan. It separates organic crystals from a solvent slurry at pressures up to 30 p.s.i.

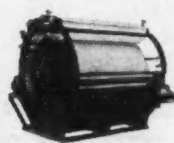
The design of this new rotary pressure scraper filter represents another achievement for Filtration Engineers in the design of filters for special applications.

If you have a problem in solvent processing . . . or any other filtration problem . . . contact Filtration Engineers for specific recommendations which are available without obligation.

Your individual requirements determine the type of filter needed, its size, construction materials and the special features necessary for highest efficiency. For more complete data, see FEinc's section in Chemical Engineering Catalog or write Dept. CPF-1059.

For a
Bigger Yield

FILTRATION ENGINEERS
AMERICAN MACHINE AND METALS, INC.
EAST Moline, ILLINOIS



STRING



HORIZONTAL

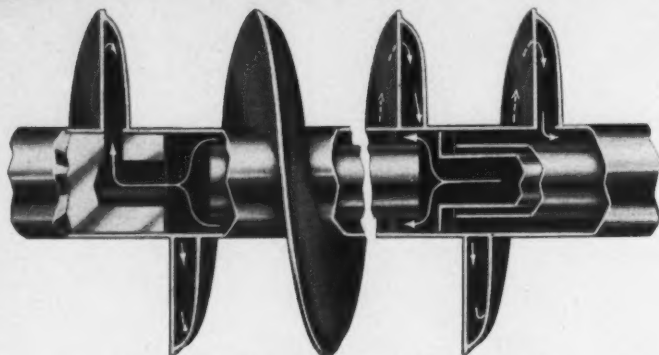


SCRAPER

SPECIALISTS IN LIQUID-SOLIDS SEPARATION

Check 1285 opposite last page.

LAST YEAR - COOLING 1.6 BILLION POUNDS/YEAR
THIS YEAR
 COOLING 2.4 BILLION POUNDS/YEAR
 —A 50% INCREASE IN
Holo-Flite * CAPACITY IN THE
 SUGAR INDUSTRY ALONE!



Arrows show how heat-transfer medium flows through core and hollow blades of screw, cooling, drying or heating processed material as it moves along in continuous bulk flow.

* "Holo-Flite" T.M. Reg.

HOLO-FLITE

IN-PROCESS USE

- Holo-Flite cools granulated or powdered sugar with equal ease!
- Discharge can be directed into multiple points of use, and dehumidified air is seldom necessary!
- Ideal for pre-cooling sugar going into cake mix and confection-coating processes!
- In candy making, Holo-Flite cooled sugar prevents distillation of essences and delicate flavors!
- With Holo-Flite, sugar is cooled as needed, eliminating costly bulk refrigeration prior to use!



COTTRELL Electrical Precipitators
 MULTICLONE Mechanical Collectors
 CMP Combination Units
 DUALAIRE Jet-Cleaned Filters
 THERM-O-FLEX Hi-Temp Filters
 TURBULAIRE-DOYLE Scrubbers
 HOLO-FLITE Processors
 HI-TURBIANT Heaters

WESTERN PRECIPITATION CORPORATION

Engineers and Constructors of Equipment for Collection of Suspended Material from Gases . . . and Equipment for the Process Industries

LOS ANGELES 54 • NEW YORK 17 • CHICAGO 2 • PITTSBURGH 22 • ATLANTA 5 • SAN FRANCISCO 4

Representatives in all principal cities

Precipitation Company of Canada Ltd., 8285 Mountain Sights Avenue, Montreal 9

Check 1286 opposite last page.

In just one year the Sugar industry alone has installed enough additional Holo-Flite equipment to cool 2.4 Billion pounds a year—a 50% increase over the 1.6 Billion pounds cooled by Holo-Flite equipment a year ago!

Let Savings Like These
 Suggest Cost-Cutting

Holo-Flite^{*} Applications in Your Operations . . .

Holo-Flite combines screw-conveyor and heat-exchanger into one efficient unit that cools, dries or heats materials in continuous bulk flow. It has many important applications throughout the process industries—applications that save time, save space, save money and boost product quality on a wide range of processing problems. Look over the multiple savings Holo-Flite is making in sugar processing. Probably comparable savings can be made in *your particular* process operations. Why not investigate today?

HOLO-FLITE

BASIC SUGAR PRODUCTION

- Sugar cooled by Holo-Flite is free-flowing for quick, simple bulk car loading!
- Quality is uniformly high without perceptible crystal degradation!
- Cooling method is dust-free, eliminating need for troublesome bag collectors!
- Efficient Holo-Flite design permits easy clean-out (although this is generally unnecessary)!
- Holo-Flite can easily be mounted on loading bridge over hopper cars to maintain outlet temperature levels from cooler to car!
- The Holo-Flite heat exchange principle is equally adaptable to use of cooling tower water, refrigerated water systems or recirculated refrigeration media!

Let us send you descriptive literature

and make recommendations for your

processes. No obligation, of course!

PROCESSING EQUIPMENT

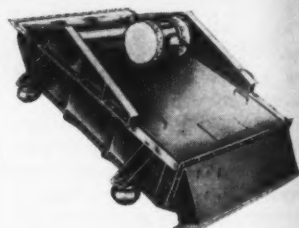
**Product losses stopped
 with dust-tight covers
 on vibrating screen**

Units can handle wide variety of wet or dry materials

Uses: Screening numerous products in chemical and allied industries.

Features: Screens are driven by powerful rotary vibrator and fitted with dust-tight covers to prevent loss of materials and reduce dispersion.

Description: Electromechanical screen has 4 x 8' screening surface. Unit is available with single- or double-



Vibrating screen has dust-tight covers, is available with either single- or double-deck screening surfaces

ble-deck screening areas and can be equipped with either 900 or 1800 rpm drive. Unit may be floor or suspension mounted.

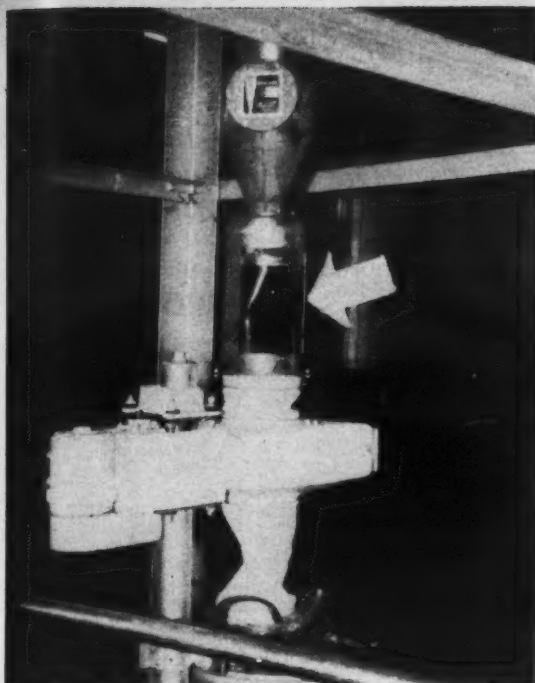
Pneumatic vibration-absorbing mounting members stop transmission of vibration to building structure or adjoining equipment. Vibrator is completely self-contained. Totally-enclosed, pressure-tight and water-proof, vibrator operates on 220 or 440-volt, 3-phase, 60 cycle alternating current.

(RVS-146 electromechanical screen is product of Syntrol Company, 110 Lexington Ave., Homer City, Pa.)

Check 1287 opposite last page.

Semi-continuous deodorizers are discussed in illustrated six-page folder. Operating data is tabulated for 7500 lb per hour system. Flow diagram depicts typical packaged installation. "Semi-Continuous Deodorizers" — Girdler Process Equipment Division, Chemetron Corporation, P. O. Box 43, Louisville 1, Ky.

Check 1288 opposite last page.



cp **PLANT ENGINEERING
MAINTENANCE
& SAFETY**
electrical & mechanical developments

One of vacuum valves used on spray dryer at Sheffield Chemical. Housing has been removed so that rubber sleeve (arrow) is visible

Rubber-sleeve vacuum valve empties bins automatically

Low maintenance, low first cost, ease of cleaning, along with simple and effective operation are advantages

GORDON WEYERMULLER, Associate Editor
with **F. J. FUESS**, Development Engineer
Sheffield Chemical, Norwich, N. Y.

Experience of Sheffield Chemical with a recently developed vacuum valve for bin and dust-collector hopper discharges has been excellent. It requires no maintenance and is easy to clean. Four of the valves are being used successfully at Sheffield.

Description of Valve

Valve consists of a collapsible neoprene sleeve mounted to cone-shaped metal valve body, which is bolted to bottom of hopper. Housing over valve is optional. Both housing and valve body are available in stainless steel.

Vacuum valve provides an airtight seal for discharge end of hoppers, bins, cyclones, or any type of dry dust collector operating under negative pressure. Seal

is maintained by the negative pressure within valve, which collapses flexible sleeve. Weight of collected material forces it through sleeve at a constant rate of flow.

Valve functions automatically and has no mechanical parts. Neoprene sleeve is resistant to most chemicals and will withstand temperatures up to 350°F. Special sleeves can be furnished for higher temperatures. One major advantage of valve is its ability to handle abrasive materials.

Sheffield Installations

Of the four valves in service at Sheffield Chemical, three are used on a vertical spray dryer which operates at a negative pressure. Two of these are at product collection points and are interconnected to a powder cooling-collection system.

Third valve is used at discharge on product collection cyclone of powder cooling system. Fourth valve is used in another operation on discharge of a cyclone recovering fines from exhaust



PROPELLAIR®
*Ventilating
Equipment*



Electronic speed test in Propellair's wind tunnel

FOR RUGGED DUTY... NEW design axial fans in sizes up to 60 inches!

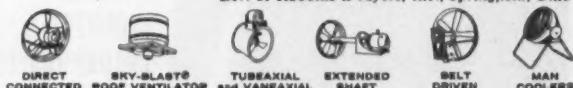
Move corrosive or explosive fumes, extreme heat or high humidity with new PROPELLAIR Type BT belt driven axial fans. They feature heavy 10 and 12-gage drums... isolated, air-cooled, protected bearings and belts... airfoil propellers cast of hi-strength aluminum-magnesium alloy... Robbins & Myers "All-Weather" motors for a single nameplate guarantee on the complete unit.

Hi-pressure, big hub propellers are available for those tough applications developing high resistance.

Send today for complete information on this modern, efficient fan. Ask for Bulletin 620—CP

PROPELLAIR®

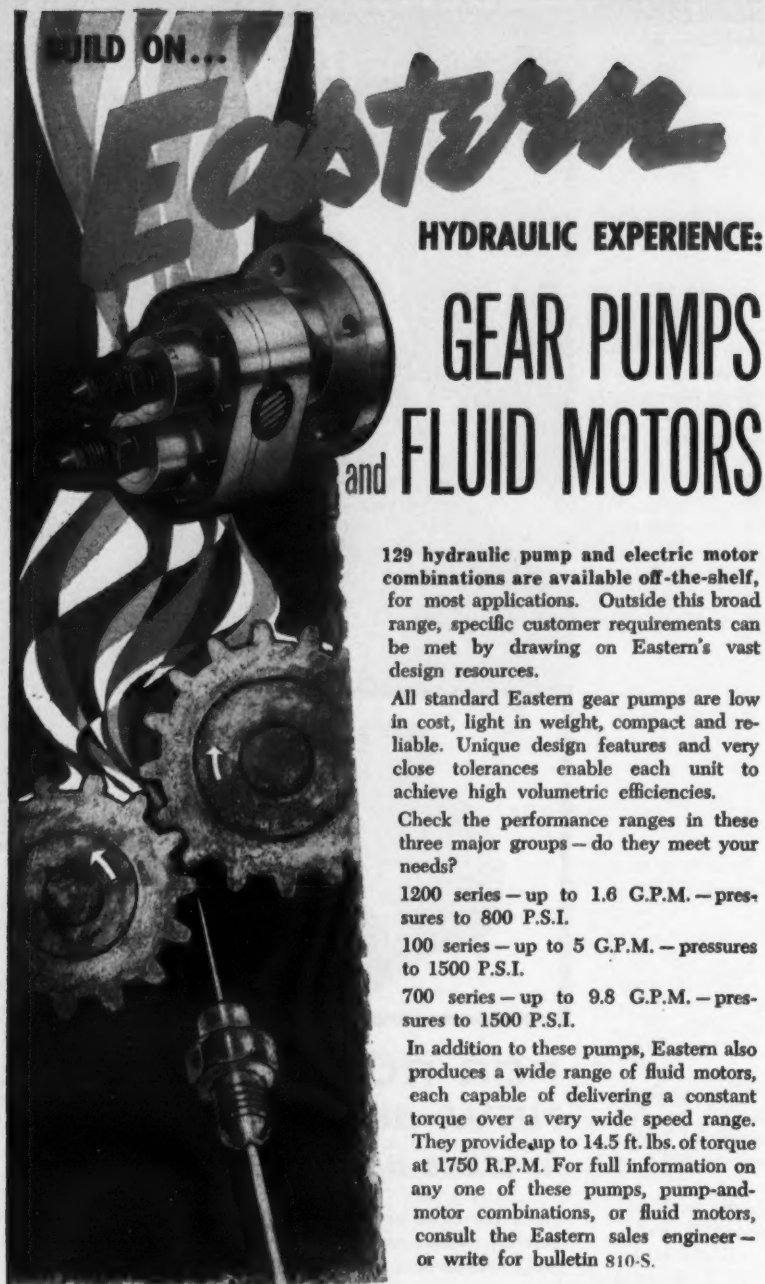
Div. of Robbins & Myers, Inc., Springfield, Ohio



MOVING AIR IS OUR BUSINESS®

Check 1289 opposite last page.

BUILD ON...



HYDRAULIC EXPERIENCE:

GEAR PUMPS and FLUID MOTORS

129 hydraulic pump and electric motor combinations are available off-the-shelf, for most applications. Outside this broad range, specific customer requirements can be met by drawing on Eastern's vast design resources.

All standard Eastern gear pumps are low in cost, light in weight, compact and reliable. Unique design features and very close tolerances enable each unit to achieve high volumetric efficiencies.

Check the performance ranges in these three major groups—do they meet your needs?

1200 series—up to 1.6 G.P.M.—pressures to 800 P.S.I.

100 series—up to 5 G.P.M.—pressures to 1500 P.S.I.

700 series—up to 9.8 G.P.M.—pressures to 1500 P.S.I.

In addition to these pumps, Eastern also produces a wide range of fluid motors, each capable of delivering a constant torque over a very wide speed range. They provide up to 14.5 ft. lbs. of torque at 1750 R.P.M. For full information on any one of these pumps, pump-and-motor combinations, or fluid motors, consult the Eastern sales engineer—or write for bulletin 810-S.

Eastern designs and builds



positive displacement pumps • gear pumps • centrifugal pumps

**EASTERN
INDUSTRIES
INCORPORATED**

100 SKIFF STREET
HAMDEN 14, CONN.



Check 1290 opposite last page.

ENGINEERING & SAFETY

gas. Fines are automatically recycled to process.

At Sheffield, when very low density or fluffy materials are handled, valves are operated in a different manner. Otherwise this fluffy material would tend to bridge and require too high a head to overcome vacuum. This cannot be tolerated where heat-sensitive materials must be removed quickly.

This problem has been solved at Sheffield by decreasing the length of the rubber sleeve, which lessens head required to overcome vacuum. In addition, valve is used with housing sealed tight and a compensating vacuum applied externally to valve sleeve itself. Latter works well with powder cooling collection systems.

Canadian Plant

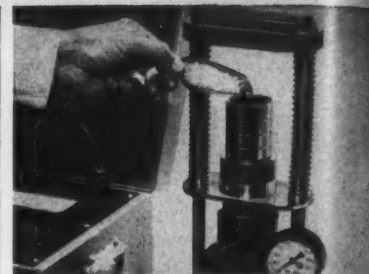
At a plant in Canada, six vacuum valves are used on discharge of cyclone dust collectors. Four are used on soda ash dust and two on lime dust. Advantages found for valves in this installation are low first cost, low maintenance, and simple and effective operation.

(Vacuum valve is product of Dustex Corp., 25 Anderson Rd., Buffalo 25, N. Y.)

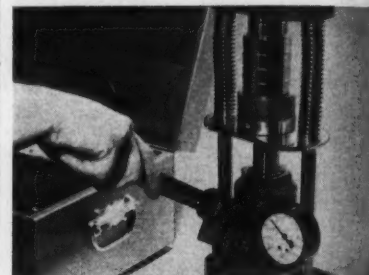
Check 1291 opposite last page.



"... Well, why didn't you tell me this was leaking acid when I picked it up?"



FEED IT...



SQUEEZE IT...



READ IT...

G-5 Moisture Register for accurate moisture tests in 60 seconds

Fastest moisture test available with accuracy to 0%. Save production and lab time—no skilled labor needed. Use Electronic Moisture Register G-5 anywhere on granular, ground, loose, shredded and powdered materials. Hydraulic pressure assures homogeneous sample. Specially calibrated for ammonium nitrate, ammonium sulphate, toilet soaps, calcium carbonate, sulphur, ammonium perchlorate, sodium bicarbonate, polyethylene resins, many more. Accuracy guaranteed. Ask for free trial.

Write, stating material to be tested, and moisture range, or check No. 1292 on reader service slip.

**ELECTRONIC
MOISTURE REGISTER**
Instruments

Moisture Register Co., Dept. CPC
P.O. Box 910, Alhambra, Calif.

Check 1292 opposite last page.

CHEMICAL PROCESSING

Chemical Boobytraps

... unsuspected hazards awaiting the unwary

Solvent vapors strike with little warning

Vapors of many common solvents used commercially and in chemical laboratories give little, if any, warning of their presence. Some of these have an odor which is only very faint or not detectable at the toxicity threshold. Accordingly, workers are often not aware of exposure.

Other solvents have an odor which is detectable before threshold limit is reached. However, many of these do not give adequate warning because the odor is not disconcerting. In fact, in some cases the odor may be actually pleasant.

Among these solvents are allyl alcohol, amyl acetate, benzene, butyl carbitol, carbitol, carbon tetrachloride, dichloroethyl ether, dimethyl sulfate, dioxane, ethylene dichloride, and methyl alcohol.

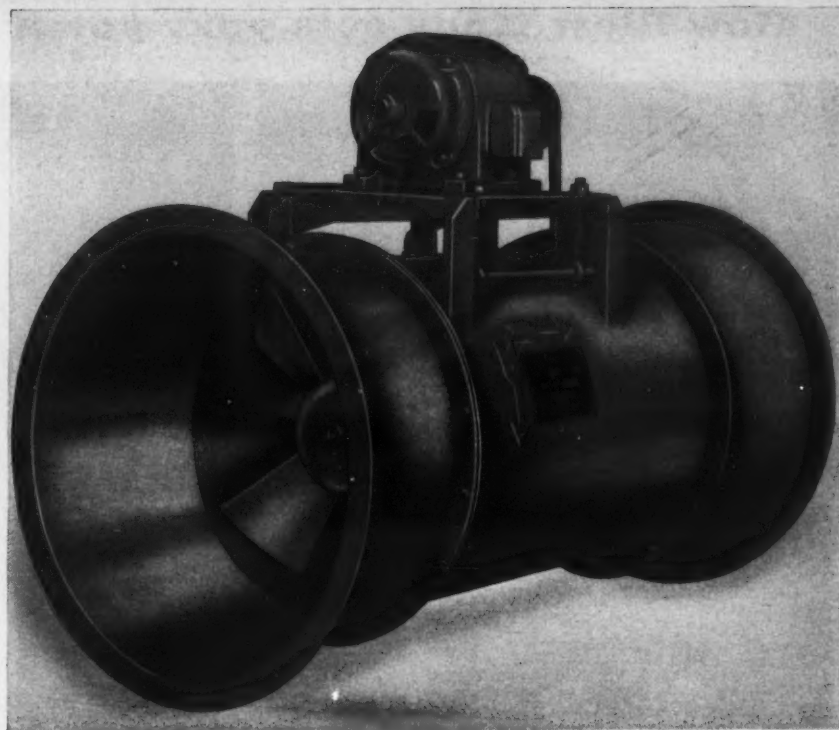
Others which can cause trouble are methyl cellosolve, methyl cyclohexane, methyl cyclohexanol, methyl formate, methyl propyl ketone, nitrobenzene, nitroethane, tetrachloroethane, tetrahydrofuran, and trichloroethane.

Reference: *Handbook of Organic Industrial Solvents*, National Association of Mutual Casualty Companies, 20 N. Wacker Drive, Chicago 6, Ill.

(Contributed by Edmund M. Buras, Jr., Safety Officer, Harris Research Laboratories, Inc., Washington 11, D.C.)

"Chemical Boobytraps" is subject of film which attempts to create awareness of serious incidents which result from unexpected or uncontrolled chemical reactions. The film, which is along the lines of the monthly series of the same name in CHEMICAL PROCESSING, is made for showing to technical personnel. It is available on loan, or on preview to purchase at \$80.00 per print basis, by writing to H. H. Fawcett, Research Laboratory, General Electric Company, Box 1088, Schenectady, N.Y.

- Quiet Running
- Easy, Economical Installation
- Maintenance-Free Long Life
- Compact
- Lighter Weight
- Ruggedly Built
- Wide Range of Capacities



"Buffalo" Type "B" Vaneaxial Fan

"BUFFALO" AXIALS SIMPLIFY MANY DIFFICULT INSTALLATIONS

"Buffalo" Axial Flow Fans are easily and economically installed because of their rugged, lightweight compactness. In all but the largest sizes, no heavy foundations or structural support are needed. "Buffalo" Axials can be installed as part of the pipe or stack in hood, vat and other roof exhaust systems.

Many ordinarily difficult installations are greatly simplified by mounting "Buffalo" Axials in straight duct runs. Duct-size, they save valuable space.

With "Buffalo" Axials, you are assured a minimum of service calls. Superb engineering and husky construction contribute to long, trouble-free life.

The "Buffalo" reputation for consistent high quality is backed by over 82 years of air-moving experience.

"Buffalo" Axials are quiet and highly efficient in many space-saving installations. These include paint spray booth exhaust, circulation of chilled air for quick-freezing, boiler room cooling, for supply and exhaust in textile plants, and many other uses. Choose from a wide variety of sizes and types to suit the needs of your installations.

Remember, when you specify "Buffalo" Axial Flow Fans, you bring your customers the finest possible performance. Call your "Buffalo" engineering representative, or write for Bulletin 3533-H.



BUFFALO FORGE COMPANY

Buffalo, N. Y.

Buffalo Pumps Division, Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

VENTILATING • AIR CLEANING • AIR TEMPERING • INDUCED DRAFT • EXHAUSTING • FORCED DRAFT • COOLING • HEATING • PRESSURE BLOWING

Check 1293 opposite last page.

How Blaw-Knox cuts your power piping costs

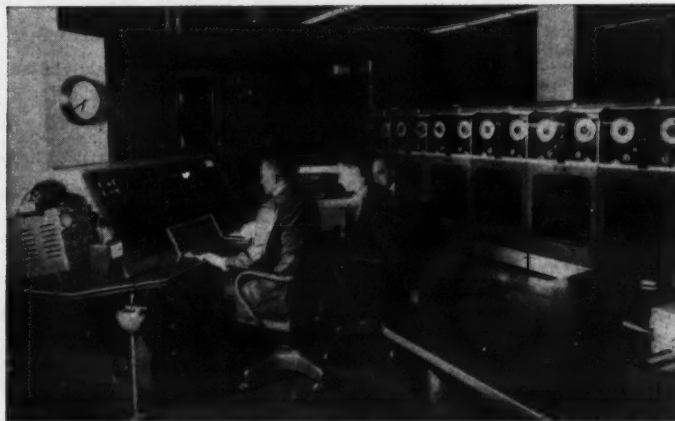


121,000 square feet of space at your service. Power piping facilities at Pittsburgh include 56,000 square feet of plant area and an additional 65,000 square feet for exterior storage. An additional new plant is located on a 15-acre site in Jackson, Mississippi.

Your job is under the personal supervision of an experienced engineer, who follows your project from beginning to end. Your piping is handled with the most modern equipment for welding, heat treating, and bending. Fabricating techniques, proven by rigid testing, are used.



New product development. Blaw-Knox developed an enclosed type of functional spring hanger as part of their complete line of hangers for supporting any piping system. Here a group of hangers individually designed for a project is factory checked to assure fast field erection.



Stress calculation cut from months to a day . . . with pace-setting engineering. An exclusive Blaw-Knox method uses an electronic computer for automatic computation with no limitation on the complexity of system. Full accuracy, with tremendous savings in time and cost. Write for details.



BLAW-KNOX COMPANY

Power Piping Division

829 Beaver Avenue, Pittsburgh 33, Pennsylvania

ARE YOU LOOKING . . .

for more information on any of the products or services mentioned in this issue of CHEMICAL PROCESSING?

Then make use of the Reader Service slip in this issue.

It's easy . . .

to use and can save time. Every month you will find a number at the end of each article or advertisement. Find this number on the slip and check it.

If several items from the same manufacturer are listed in the story just write the item down in the space provided on the Reader Service slip. Don't forget to include the key number.

Then fill out the slip and mail it to Reader Service Department. We will contact the manufacturer for you.

Additional details will be sent direct to you.

Be sure . . .

to fill in the slip with the other pertinent information: your name, title, company, product made, and address.

For more information on product at left, specify 1294 see information request blank opposite last page.

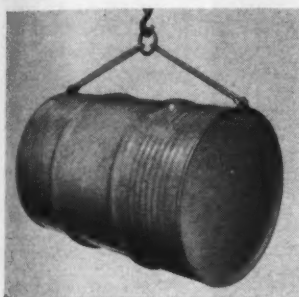


Drums of volatile liquids safely handled

Uses: Handling drums of volatile liquids.

Features: Lifting hook is attached to any type of hoist by means of three-inch-diam ring. Hooks are engaged over each end of drum for safe movement.

Description: Cast drum-lifting hook is made of non-sparking manganese bronze. It is connected to three-inch-



Drum-lifting hook has clearance for $\frac{3}{4}$ " rim; will accommodate standard 55-gal drums

diam bronze ring with double 7/16-inch-diam brass rods.

Hook has clearance for $\frac{3}{4}$ " rim. It will accommodate standard 55-gal drums, as well as any drum to 34" in length. Capacity is 1000 lb.

(Drum-lifting hook 41M is product of Morse Manufacturing Company, Inc., East Syracuse, N.Y.)

Check 1295 opposite last page.

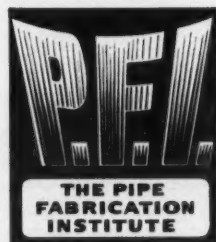
WANTED:**To Keep You Alive**

Almost everyone knows of some tricky unexpected danger situation in his plant. CHEMICAL PROCESSING feels that the dissemination of such information to readers is important. Therefore a monthly series on Chemical Boobytraps is now appearing in this section. If you know of any such situation, please forward an account of it to:

Safety Editor
CHEMICAL PROCESSING
111 E. Delaware Place
Chicago 11, Illinois

**SEND COUPON BELOW FOR THESE P.F.I. STANDARDS**

- 1 Machining Backing Rings for Butt Welds
- 2 Dimensioning Welded Assemblies
- 3 Linear Tolerances Bending Radii
- 4 Shop Hydrostatic Testing
- 5 Cleaning Fabricated Piping
- 6 Built-up Weld, Metal Bosses
- 7 Welded Nozzles—Spacing
- 8 Preheat-Postheat Before, After Welding
- 9 Arc-Welding Dissimilar Ferritic Steels
- 10 Stress Relieving Practices
- 11 Affixing Permanent Symbols to Piping



While we're afraid the P.F.I. Standards wouldn't be much use to the moon travelers above, they are valuable to you "earth-grounded" readers.

Listed at the left are the technical bulletins that are proving their usefulness to many engineers.

These P.F.I. Standards are packed with vital data on the design, the fabrication and erection of high pressure and high temperature piping used by all industry. However, these technical bulletins do not explain the many advantages of shop fabrication.

Remember, shop fabrication by the companies responsible for the development of P.F.I. Standards is your only real assurance of meeting the most exacting requirements of piping, whether it's welded, bent, coiled or vanstoned . . . in any metal as a component or a complete assembly. Write for all ten P.F.I. Standards or indicate in the coupon below which ones could be helpful to you.

THE PIPE FABRICATION INSTITUTE

Devoted to the Technical and Economic Problems in Piping
ONE GATEWAY CENTER, PITTSBURGH 22, PA.

Please send me the P.F.I. Standards indicated

CP-10

1 2 3 4 5 6 7 8 9 10 11

Name _____

Company _____

Address _____ City _____ State _____

Check 1296 opposite last page.

UNIBESTOS CUM LAUDE THE SCHOOL HARD KNOCKS

**There's only one UNIBESTOS ...
the pipe insulation that's worth more money!**

No breakage in shipment or handling ... goes on quicker ...
cuts and fits easily ... take it off and put it back on as
often as you wish ... highest efficiency for temperatures to
1200°F ... sizes to 44" o.d., single-layer thicknesses to 5".

UNARCO

UNION ASBESTOS & RUBBER COMPANY

General Sales Offices: 1111 W. Perry St., Bloomington, Illinois

Distributors in Principal Cities. Ask for free 40-page

Catalog F76-321 with exclusive UNARCO "J" Factor Tables.

LOST YOUR SLIDE RULE?

Then CP's Processing and Engineering Data Section is for you.

Each month, this section contains time-saving nomographs, tables, or charts which other data savers have found extremely useful in speeding calculations. Perhaps, you will find them to be of value to you.

A wide variety of information can be found in this section. So no matter what your particular field you will find suitable data to aid you in your daily work.

And —

the section pages are designed to fit easily into regular data files.

Keep them handy for use in making quick calculations in the plant or office.

Just cut along the marked edge, punch as indicated, and insert them into your notebook.

So —

be sure not to miss this month's "Data Section." It begins on page 47.

For more information on product at left, specify 1297 see information request blank opposite last page.

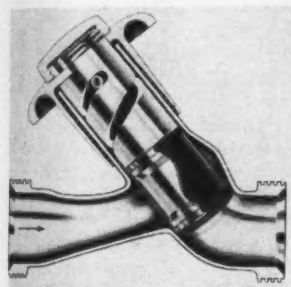


**Flat-sheet fabrication
eliminates porosity
in valve**

Product is only in contact
with body and sealer

Uses: Where sanitary con-
siderations are of prime im-
portance.

Features: Body of valve is
fabricated from flat, polished
stainless-steel sheets. This
eliminates porosity. Synthetic-
rubber-like material (non-
toxic, odorless, and tasteless)



Sealing element of seatless sani-
tary stainless-steel valve is syn-
thetic-rubber-like material

is used for sealing element.
This boot and body are only
parts having contact with
product flowing through valve.

Description: Seatless stain-
less-steel valve is available
with boot in compounds to re-
sist action of air and various
products, in temperature
range of -60 to +300°F.

To complete most installa-
tions, only two self-draining
body types—line and angle—
are necessary. Light weight
and strong structure make
valve suitable for installations
using Pyrex tube.

(Sanitary stainless-steel
valves are product of Stehlin
Corporation, 1724 Los Angeles
St., Los Angeles 15, Calif.)

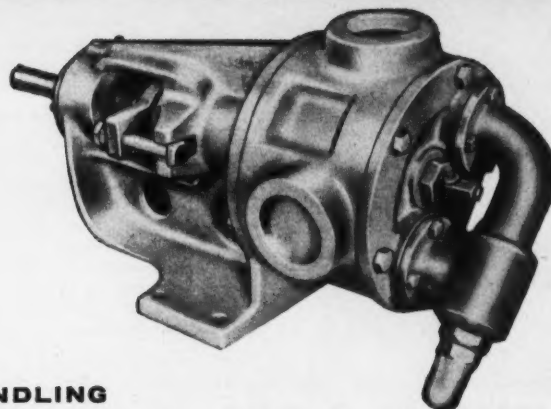
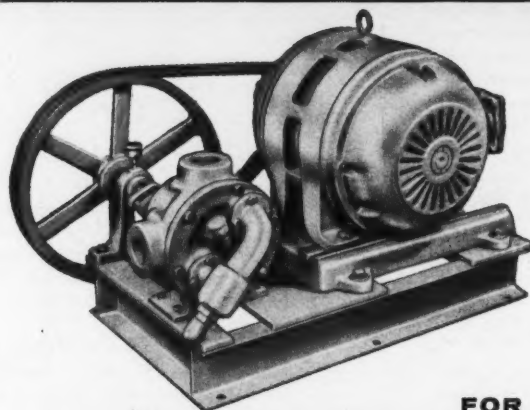
Check 1298 opposite last page.

Handling tool fittings, for high-
voltage (2500v and above) power
fuses, cut-outs, switches, and load
interrupters, are subject of 12-page
catalog which illustrates and de-
scribes function and construction
of 15 basic tools. Bul 823—S&C
Electric Company, 4435 N. Rav-
enswood Ave., Chicago 40, Ill.

Check 1299 opposite last page.

NOW...FOR GENERAL INDUSTRIAL USE

DEMING ROTARY PUMPS



FOR HANDLING

SOLVENTS • FUEL OILS • LUBRICATING OILS • CHEMICALS • ALKALIES

The complete Deming Rotary Pump line is now available in sizes ranging from
3/8" through 8" for pressures to 200# and capacities to 1050 gallons per minute.

You'll want to know more about the Deming Rotary Pump line! Send today for
complete descriptive literature.

The DEMING Co.

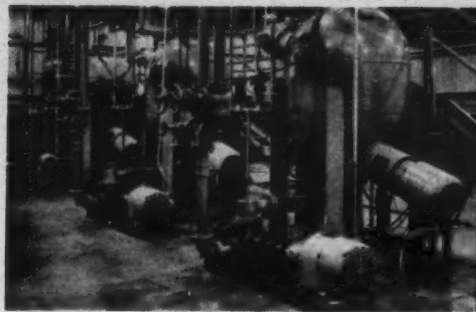
1007 BROADWAY • SALEM, OHIO

Send me
Literature on
the Deming
Rotary Pump
Line.

NAME _____
COMPANY _____ POSITION _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

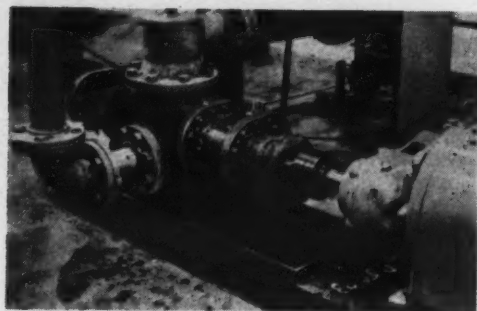
Check 1300 opposite last page.

For High-Viscosity Pumping--



specify
**Sier-Bath
SCREW
PUMPS**

SHUFORD MILLS pumps rubber-resin adhesives of 700,000 SSU at 140°F.

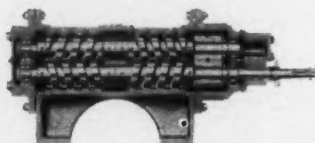


At Shuford Mills, manufacturers of pressure sensitive tapes, 5 Sier-Bath Pumps transfer heavy liquid adhesive from mixing tanks to storage tanks. These mixtures, consisting of toluene, MEK, natural rubber, synthetic rubber, resin and additives, have been pumped by Sier-Bath Screw Pumps with good success since 1955. All gears and bearings are externally mounted to avoid contact with materials pumped. A Sier-Bath Hydrax Pump is also used to pump varnish and a Sier-Bath Gearax Pump handles toluene and MEK solvents.

Sier-Bath SCREW PUMPS



External Gear and Bearing Bracket Type for non-lubricating liquids and semi-liquids



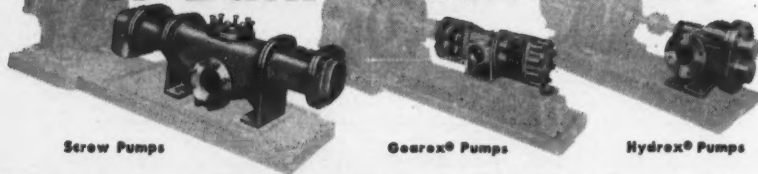
Internal Gear and Bearing Type for lubricating liquids and semi-liquids

Sier-Bath Screw Pumps maintain high volumetric efficiency because "Dual-Controlled" precision rotor design prevents rotor-to-rotor or rotor-to-casing contact—provides a continuous flow without pulsation, hammering or vibration . . . without strains, misalignment and wear on rotors, shafts, bearings and gears.

Result: Dependable, uninterrupted pumping service—less maintenance—easier servicing—longer pump life—lower overall pumping costs.

Capacities from 1 to 2,000 gpm.; viscosities from 32 SSU to 1,000,000 SSU; discharge to 1,000 psi. for viscous liquids, 200 psi. for water and light oils. Horizontal or vertical construction. Corrosion resistant alloys, special bodies, stuffing boxes and bearings for special needs. See "Yellow Pages" for your Sier-Bath representative or write Sier-Bath Gear & Pump Co., Inc., 9260 Hudson Blvd., North Bergen, N. J.

Sier-Bath ROTARY PUMPS



Screw Pumps

Gearax® Pumps

Hydrax® Pumps

Founded 1903

Mfrs. of Precision Gears, Rotary Pumps, Flexible Gear Couplings

Member A. G. M. A.

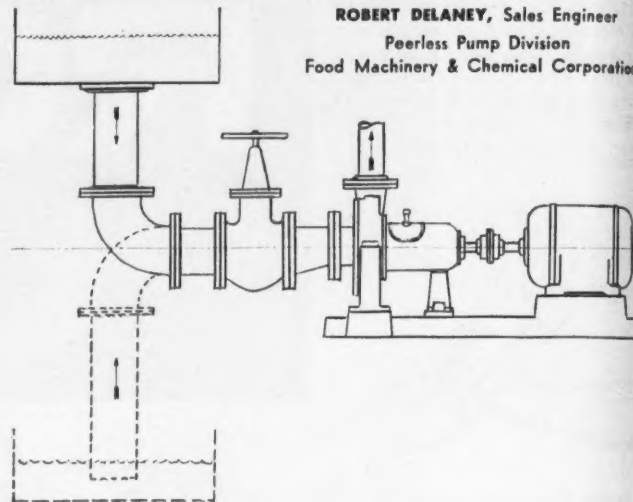
Check 1301 opposite last page.

PLANT ENGINEERING MAINTENANCE & SAFETY

Wherever centrifugal pumps are found, around the corner lurk . . .

CAVITATION PROBLEMS

ROBERT DELANEY, Sales Engineer
Peerless Pump Division
Food Machinery & Chemical Corporation



In recent years, incorporation of higher specific speeds into centrifugal-pump design has placed the cavitation problem in an increasingly more prominent position in the hydraulic-machinery-research picture.

Cavitation occurs when a local pressure drop causes cavities, filled with water vapor, to be formed. These cavities collapse as soon as vapor

bubbles reach high-pressure regions.

Reduction of absolute pressure to that of vapor pressure may be either general or local. Latter may be realized without average-pressure change. A general pressure drop may be produced by any one of the following means:

- 1) Increase in static lift of centrifugal pump.
- 2) Decrease in atmospheric

Suction Specific Speed

An index of the ability of a centrifugal pump to operate without cavitation is the magnitude of its suction specific speed. Pump designers use specific speed to determine NPSH requirements of an impeller design. This index may be expressed as follows:

$$S = N \sqrt{\frac{Q}{H_{sv}^{1.5}}}$$

where, S = suction specific speed
N = pump rotative speed, rpm
Q = pumping capacity, gpm
H_{sv} = NPSH above vapor pressure, feet of liquid at pump suction nozzle

pressure with rise in altitude.

- 3) Decrease in absolute pressure of system.
- 4) Increase in temperature of liquid being pumped, resulting in higher vapor pressure of pumped liquid.

Local decrease in pressure is produced by velocity increase from pump, speed-up in separation and contraction of flow, and deviation of streamlines from normal trajectory. Low absolute pressure and cavitation may also be initiated by sudden starting and stopping and recoil of water column. Transient in character, this is of little importance.

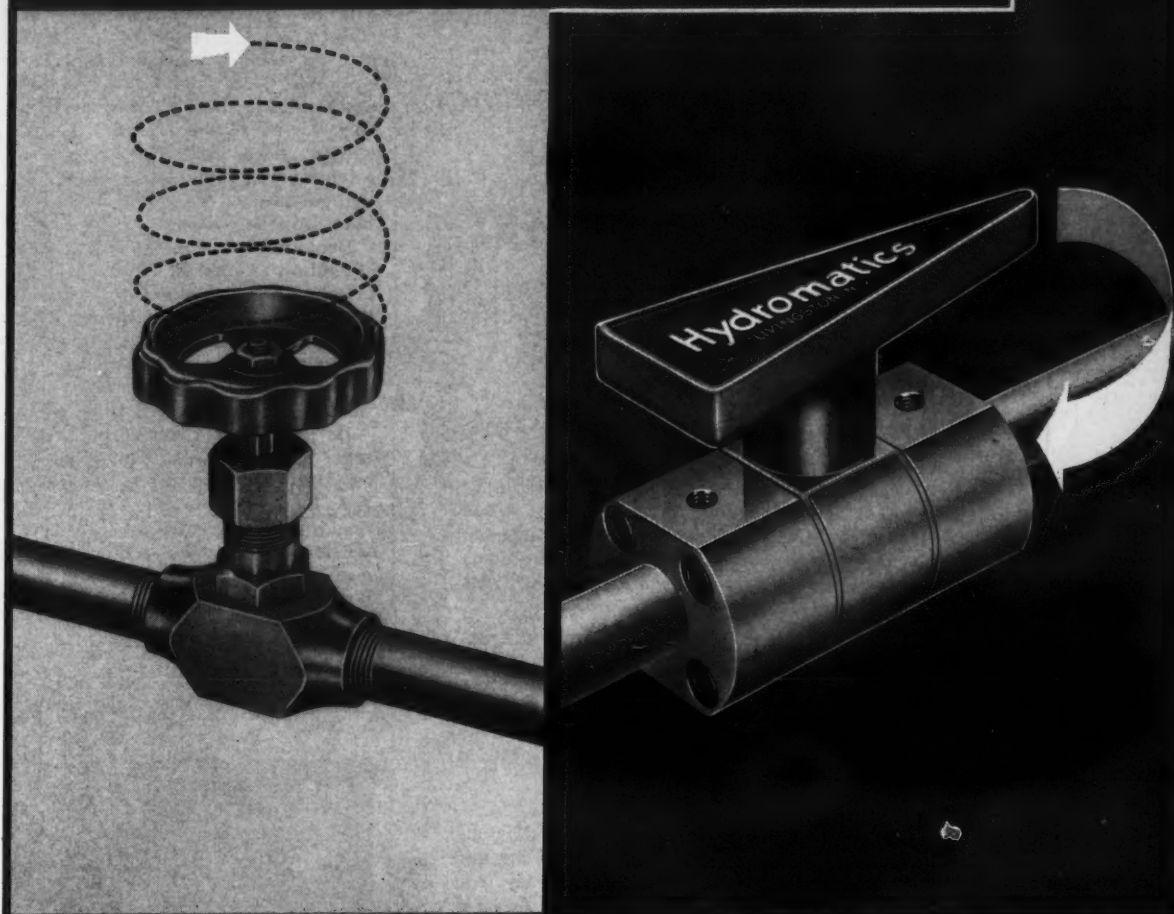
Signs of cavitation are noise and vibration, drop in head-capacity and efficiency curves, impeller-vane pitting, and corrosion-fatigue failure of metals.

Noise and vibration is produced by sudden collapse of vapor bubbles. This behavior is characteristic of all pumps to varying degrees. Small amounts of air may be introduced into pump suction to eliminate noise. Air serves as a cushion when vapor bubbles collapse. This technique also serves to reduce impeller-vane pitting.

With low-specific-speed pumps of up to 1500, head-capacity, efficiency, and brake-horsepower curves drop off suddenly when capacity is increased to cavitation point. In pumps of 1500 to 5000 specific speeds, head-capacity and efficiency curves begin to drop along whole range gradually before sudden break-off point is reached. Degree of drop in head-capacity and efficiency curves depends on specific speed and on suction pressures.

Pumps having specific speed of above 6000 seem to have no definite break-off point on curve. There is a gradual drop in head-capacity and efficiency curves along whole pump range. Since efficiency drop occurs prior to head-capacity-curve drop, it is a fairly reliable criterion of approaching cavitation conditions. Objectionable noise may

FLO-BALL 715 makes needle valves obsolete



WHICH VALVE CLOSES FASTER?

Unlike the many turns required to operate a needle valve, the Hydromatics **FLO-BALL 715**, shown on the right, closes instantly with a mere $\frac{1}{4}$ turn . . . **positive action** at flow pressures up to 3,000 psi with just a 4 inch-pound torque! And the arrow-shaped handle shows both open and closed positions at a glance. Exclusive **FLO-BALL** straight-thru design has 100% flow efficiency—more than double the flow of needle valves.

Ideal for leakproof control of air, vacuum, steam, water, fuels, oils, kerosene, alcohol, etc., the **FLO-BALL** features zero leakage, universal mounting, removable flanges, and all stainless steel construction.

Write today for a complete catalog describing this valve and others for corrosive and cryogenic media. Also special designs for throttling flow control.

The **FLO-BALL** costs no more than old fashioned screw-type valves!

Hydromatics, Inc.

LIVINGSTON, N. J. • WYMAN 2-4900 • TWX - LIVINGSTON, N. J. 120

Copyright 1959 Hydromatics, Inc.

Exceptional engineering employment opportunities—write today!

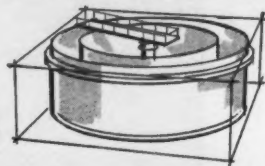
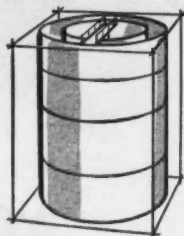


Check 1302 opposite last page.

DORR-OLIVER JOINTERS

A SERVICE TO THE PROCESSING INDUSTRIES

"PACKAGED UNITS" SOLVE PLANT WATER TREATMENT AND SEWAGE PROBLEMS



The trend to dispersal of industrial plants and the location of new factories in previously undeveloped areas often involves problems of water treatment and sewage disposal. Even when plants have been long established, the same problems may arise as existing facilities become inadequate or conditions change in the surrounding area.

A ready solution is found in the new "packaged" treatment units now available from Dorr-Oliver. Essentially, these offer all the advantages of conventional, large scale systems in a compact, easily installed form suitable for individual plant installations. Basic equipment for each unit is all designed into a single tank. This "unitized" approach not only produces simple, easily maintained units, but also results in relatively low cost.

The Dorco PeriFilter System, for example, combines a pre-treatment mechanism and a rapid sand filter to provide a continuous supply of purified water. Depending on the pre-treatment method used, the unit will remove hardness, turbidity, color and/or iron and manganese. Operation can be manual, semi-automatic or fully automatic.

The Dorr-Oliver CompleTreator is a complete sewage treatment unit, operating on the modern Biofiltration principle. In a single welded steel tank, it combines processes that normally would require five tanks. It is so compact that it can be shipped complete by rail or truck, yet has a treatment capacity for 150 population equivalent. Where greater capacity is required, two or more units can be readily installed, or consideration may be given to other Dorr-Oliver equipment.

The development of treatment plants for water, sewage and industrial wastes has long been a Dorr-Oliver specialty. If you'd like to learn more about such equipment, with particular application to your own special problems, just drop a line to Dorr-Oliver Incorporated, Stamford, Connecticut.

Dorr-Oliver offers a wide range of equipment, methods and complete systems for the processing industries. Examples include:

WATER AND WASTE TREATMENT • ROASTING • DRYING • CLASSIFICATION
THICKENING • SCREENING • FILTRATION • CLARIFICATION • WASHING
AGITATION • CENTRIFUGATION • ION EXCHANGE • PUMPING

Dorco, PeriFilter, CompleTreator—Reg. U. S. Pat. Off.

Check 1303 opposite last page.

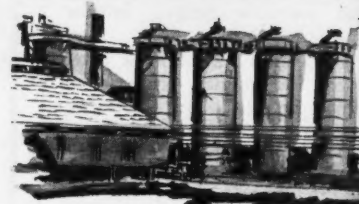
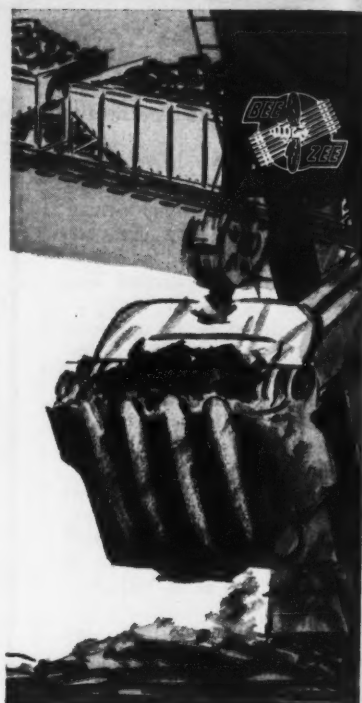
ENGINEERING & SAFETY

not appear until cavitation has reached point of commercially unacceptable efficiency.

Pump operation under cavitation conditions initiates pitting on impeller vanes. Electrolytic and chemical action are not factors in this process. This was established by producing cavitation in venturi-shaped channel made of neutral glass, which pitted in same manner as metal in centrifugal-pump or water-turbine impeller-vanes.

Behavior of metals under cavitation parallels that of metals under corrosion-fatigue conditions. Any notches, nicks, scratches, flaws, or sharp corners, on the surfaces of metals attacked by cavitation, accelerate pitting.

It has been demonstrated that water temperature has marked effect on metal loss. At higher temperatures, amount of air dissolved in water is lowered, thus reducing cushioning effect on water-hammer blows. Also, increased vapor pressure tends to increase the vapor-bubble formation.



mine to market faster with BEE-ZEE SCREENS

How you screen your product has its effect on how fast you sell it. Bee-Zee Screens use sharper sizing, better dewatering, and non-clogging features to move mined products faster...to make you money. Special applications and difficult conditions are "everyday jobs" for these stainless steel, precision-welded screens. Engineered in the right size, the right shape and with the right rods for your individual operation, Bee-Zee Screens can be the difference between problems and profit.

Ask your Screening Equipment Manufacturer or write, wire or phone Galesburg Dickens 2-5154 collect.


ROUND-ROD SCREEN
long-life accuracy


GRIZZLY ROD SCREEN
rugged accuracy


ISO-ROD SCREEN
prolonged accuracy


TRI-ROD SCREEN
knife-like accuracy


GRIZZLY ROD WITH
SKID ROD
ruggedest accuracy

BIXBY-ZIMMER
ENGINEERING COMPANY

7109 Abingdon Street, Galesburg, Illinois

Check 1305 opposite last page.

CHEMICAL PROCESSING

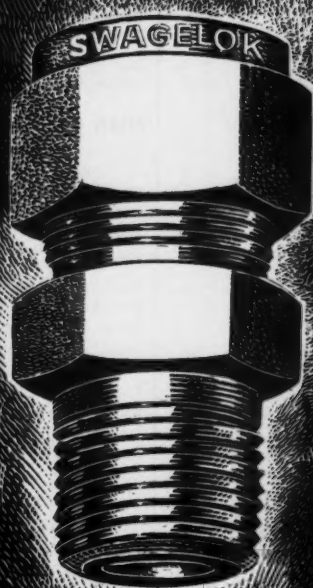


Eye-rinse bottle

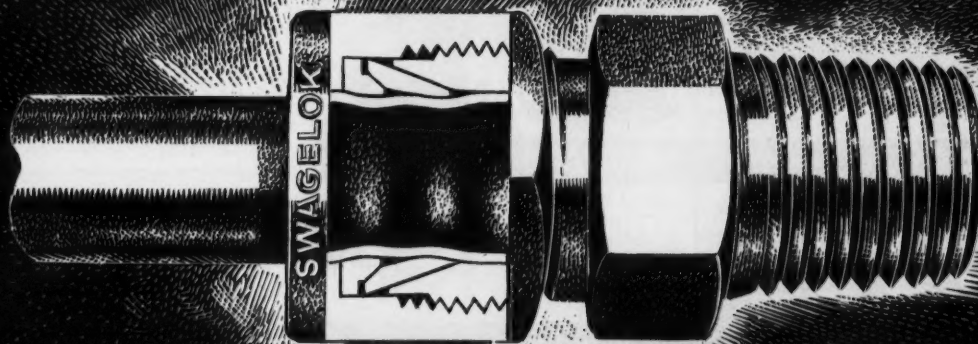
... incorporating pneumatic principle is effective in rinsing for both slight and severe chemical burns. Bottle is unbreakable.

(Eye-bath bottle is distributed by Advance Glove Manufacturing Company, 901 W. Lafayette Blvd., Detroit 26, Michigan.)

Check 1304 opposite last page.



*the
Standard
of Quality
in
Tube Fittings*



Swagelok®

the name that stands apart from
all others in the field... outstanding
and unique in concept, craftsmanship
and leakproof performance

For
more informa-
tion on product
at right, specify
1306 see in-
formation
request blank
opposite last
page.



CRAWFORD FITTING COMPANY, 884 East 140th ST., CLEVELAND 10, OHIO • CRAWFORD FITTINGS (CANADA) LTD., NIAGARA FALLS, CANADA

Renneburg Processing Equipment



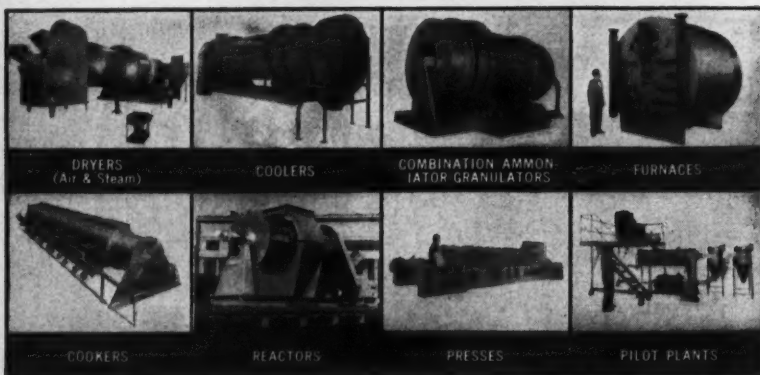
Serving
the
Process
Industries
for Over
85 Years

FOR THE CHEMICAL INDUSTRY



RENNEBURG 24 million BTU/Hr capacity Refractory-lined Furnace—used with 8' dia. x 60' Dryer (left), parallel with 8' x 60' Counter-Current Cooler.

RENNEBURG Rotary Drying Unit (behind Counter-Current Cooler in foreground)—Equipped with 5-compartment insulated cloth-type collectors, having orlon dust tube filters for effective air pollution control.



KILNS • COMBUSTION EQUIPMENT • CALCINERS • FANS • COLLECTORS
AIR POLLUTION CONTROL SYSTEMS • AMMONIATORS* • GRANULATORS*
PUG MILLS • EVAPORATORS • MIXERS • ELEVATORS • CONVEYORS • ROASTERS

*TVA Licensed Manufacturer

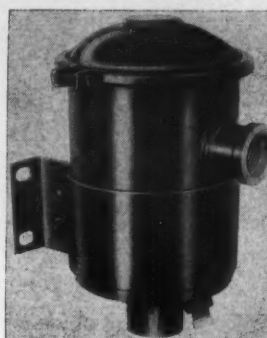
Literature and information on request

EDW. RENNEBURG & SONS

2632 BOSTON STREET, BALTIMORE 24, MD.

Check 1307 opposite last page.

ENGINEERING & SAFETY



High-pressure filters

... are capable of operating at pressures to 1000 psi and temperatures to 275°F. Filters are designed for use in pneumatic and hydraulic systems.

Design versatility permits use of replaceable paper elements, wire mesh, or varied-spacing metal-edge filtering media, with degrees of filtration ranging from 2 to 25 microns. Clamp lock-ring construction on steel housing affords element change and replacement without disconnection of filter from circuit.

Filters are furnished with mounting brackets, inlet and outlet connections, and internal relief valves to insure bypass of fluids in case of stoppages. Relief-valve settings vary from 15-20 psi for lower differential pressures to 45-55 psi for higher pressures. For suction side installations, four- to six-psi settings are available.

(P-192 filters are product of Purolator Products, Inc., Rahway, N.J.)

Check 1308 opp. last page.

Crank-arm action out in air pressure pump good to 50,000 psig

Air-transfer flow reversed by transfer valve

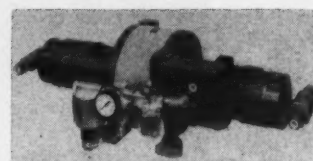
Uses: Pumping liquids in locations where electrical power is not available and/or safe to use.

Features: In air-powered pumps, conventional crank-arm action has been eliminated. Air-transfer valve incorporated into pump automatically reverses flow of air

pressure from one side of drive piston to other. In this manner, continuous pumping action is maintained as long as air-pressure is supplied. Pumps develop liquid pressures to 50,000 psig at temperatures to 500°F.

Description: Air-operated pumps have duplex design. One piston provides suction while other delivers high-pressure fluid. Piston has small clearance volume at discharge stroke.

Maximum pressure of 100 psig of air is all that is necessary to operate pumps. Check-



Pump system has small clearance volume at discharge stroke

valve assemblies are external and easily accessible for maintenance and replacement. Standard packing is alternate leather and bronze chevron-type. Other packings are available for special applications.

(Air-operated pumps are product of American Instrument Company, Inc., 8030 Georgia Avenue, Silver Spring, Maryland.)

Check 1309 opposite last page.

Gear lubricant

... for heavy-duty use is available in SAE 90 and 140 Grades. Lubricant has equally good load-carrying ability throughout entire range of sliding velocities.

Lubricant specifications are as follows:

	SAE	
	90	140
Viscosity index	100	97
Flash point, °F	390	395
Fire point, °F	420	415
Pour point, °F	0	0
lb/gal	7.5	7.6

(Lubricant 223X is product of Alpha-Molykote Corporation, 65 Harvard Ave., Stamford, Conn.)

Check 1310 opposite last page.

CHEMICAL PROCESSING

BRANSON

Ultrasonics at work...
**CORROSION SURVEYS
and FLAW DETECTION**



AUDIGAGE® 6 — the new miniaturized, self-powered "mighty midget" Thickness Gage and Flaw Detector. Ideal for corrosion surveys by one man in awkward locations. Weighs less than 5 pounds complete. Uses new high-sensitivity, high-resolution **Type Z** transducers, flat or curved, in various mounts for every application. Measures directly in inches between 0.09" and 5.0". **BULLETIN A-201.**



AUDIGAGE® 5 — the standard self-powered instrument for field corrosion surveys when greater range or accuracy than Model 6 are required. **BULLETIN A-2.**



VIDIGAGE® 14 — the high-accuracy, high-speed, ultra-sensitive gage with a 14" CR tube. Range 0.005" to 2.7" with accuracies to 1/10 of 1%. Interchangeable oscillators and direct-reading scales. Extension cables and intercom phones for remote testing up to one-fifth mile from the basic instrument. **BULLETIN V-200.**



SONORAY® 5 — the new portable, high-performance pulse-echo Flaw Detector for testing weldments, shafts, plates, etc., and detecting other internal flaws. Only 37 lbs., 7½" x 11" x 20¼" long. **BULLETIN T-203.**

Send Coupon to **BRANSON INSTRUMENTS, INC.**
51 Brown House Road, Stamford, Connecticut

BRANSON: Send Bulletin A-201, A-2, V-200, T-203.

NAME _____

FIRM _____ DEPT. _____

ADDRESS _____

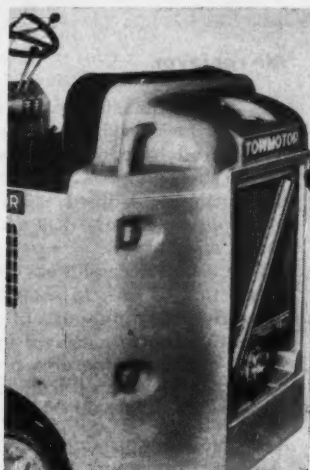
ENGINEERING & SAFETY

**Fork-lift-truck exhaust
fire-hazard threat
is eliminated**

Engine more accessible
around carburetor

Recently developed exhaust system for fork lift trucks is engineered to provide protection against fire hazards. Exhaust system includes spark- and flame-arresting tail pipe.

Also incorporated is multi-perforated tail-pipe extension,



Multi-perforated exhaust extension (mounted on fork-lift truck) is shown with protective grill removed

placed across back face of lift-truck radiator. This arrangement directs exhaust flow against radiator fins and directly into fan-discharge air stream. Thus, sparks and flame caused by engine backfiring are effectively dissipated.

This system also employs all-welded dry-type muffler. Engine accessibility in area of carburetor is proved by utilization of exhaust system.

(Cool-Flow exhaust system is development of Towmotor Corporation, 1226 E. 152nd St., Cleveland 10, Ohio.)

Check 1312 opposite last page.

Emergency and decontamination showers are described in 20-page Bul 59 — Logan Emergency Showers, Inc., Box 111, Glendale, California.

Check 1313 opposite last page.

**WHEREVER BIG THINGS
ARE BEING DONE
IN MILITARY ESTABLISHMENTS THROUGHOUT THE WORLD
(AND ELSEWHERE)**



YOU WILL FIND

Scott

AIR-PAKS

**The World's Finest Protective
Breathing Equipment**



SAFETY EQUIPMENT DIVISION

SCOTT AVIATION CORPORATION

242 ERIE STREET, LANCASTER, N. Y.

Canada: Safety Supply Co., Toronto — Branches in Principal Cities
Export: Southern Oxygen Co., 250 West 57th Street, New York 19, N. Y.

MILITARY EMERGENCY ESCAPE SYSTEMS AND OXYGEN EQUIPMENT FOR CIVIL AVIATION INCLUDING THE WORLD'S LEADING AIRLINES

Check 1314 opposite last page.

Check 1311 opposite last page.

GOODALL

Guaranteed Protection in Plant and Laboratory...

COATS • APRONS OVERALLS

Available in rubber, rubber latex and neoprene latex, in a wide range of styles and sizes. Carefully tailored to provide fine appearance, maximum comfort and long wear. Acid-and oil-resistant suits.

Safe-Durable-Comfortable



"GOODSEAL" *All-Purpose Gloves*

Made of special compound impervious to actions of oil, acids, alkalis, animal fats and most other solids and solutions. Smooth, flexible, easy to wear. Highly resistant to snagging and puncturing. Extra-grip finish on finger tips.

BOOTS • SHOES • RUBBERS

Rubber and Neoprene Boots and Lace Work Shoes, and Maroon Butyl Boots, with or without "Toe-Saver"® Safety Toe. Slip-resistant soles. Plastic Boots. White Dairy Boots. Best quality Work Rubbers, net lined.



"If it's GOODALL, it MUST be Good!"

Contact Our Nearest Branch for Details and Prices
See Pages 348-349, Chemical Engineering Catalog

Standard of Quality—Since 1870



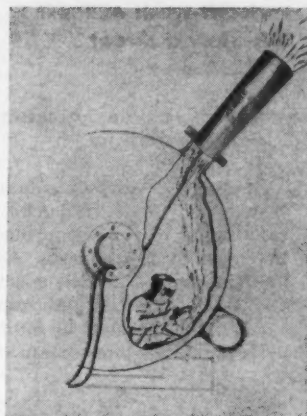
HOSE • BELTING • FOOTWEAR • CLOTHING
AND OTHER INDUSTRIAL RUBBER PRODUCTS

GOODALL Rubber Company

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.
BRANCHES AND DISTRIBUTORS THROUGHOUT THE UNITED STATES.
IN CANADA: GOODALL RUBBER CO. OF CANADA LTD., TORONTO.

Check 1315 opposite last page.

ENGINEERING & SAFETY



Air remover

... for exhausting welding fumes from closed work areas is powered by compressed air from shop line. Cylindrical unit utilizes modified venturi principle to remove smoke, fumes and hot air.

Operation necessitates only connection of unit to shop air line. By directing current of air out, pressure is drawn into other openings, thereby providing continual fresh-air supply.

(Air mover is product of The Arcair Company, Box 431, Lancaster, Ohio.)

Check 1316 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Dust removed from gas with same efficiency for high, low loads

Uses: Removal of mechanically entrained dust and oil from gas.

Features: Dust-removal efficiency is as high at low loads as at rated capacity. It will remove 80% of sub-micron particles and nearly 100% of particles two to three microns and larger in size.

Description: Multi-phase gas cleaner (with four phases of scrubbing) is applicable to

Would you like
to receive
**CHEMICAL
PROCESSING**
personally?

It will be sent to you
without charge or
obligation . . .

. . . if you qualify
. . . if you request it

If you are responsible for processing operations in an administrative capacity as plant superintendent, chemical engineer, chemist, engineer or equivalent responsibility . . . in a plant of substantial operations* where chemical processing is an important factor . . . **CHEMICAL PROCESSING** will be sent to you without charge or obligation if you request it. Use form below. In requesting, be sure to answer all questions. If your firm is not rated or listed in standard references, indicate size of the company by capacity, annual sales or number of employees. Unless all information is given, magazine will not be sent.

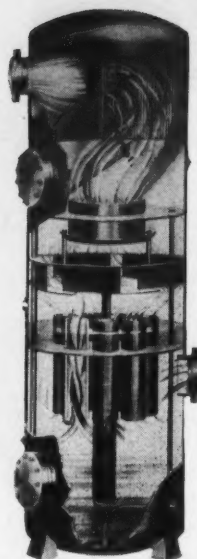
*"Substantial operations" does not necessarily mean an extremely large plant. But requests for the magazine exceed supply so we must set standards to insure publication being sent where it can be used to best advantage.

CHEMICAL PROCESSING
111 EAST DELAWARE PLACE
CHICAGO 11, ILLINOIS

Please send me **CHEMICAL PROCESSING** without charge or obligation

Name _____
Title _____
Company _____
Rating of Company _____
Street _____
City _____ Zone _____
State _____
Main Products _____

CHEMICAL PROCESSING



Multi-phase gas cleaner has low oil loss over entire operating range

systems having wide hourly load swings and/or seasonal variations. Units are available in sizes of 18 to 72" diam. Capacities are to 18,000,000 standard cu ft/hr of gas at 1000 psig, for any desired design pressure.

Cleaners have low oil loss over entire operating range. Because of six phases of separation, oil lost by mechanical entrainment over flow range will not exceed 0.02 to 0.03 gal/million standard cu ft of gas. Minimum velocities are maintained through separation phases, at both low and high flows.

(Multi-phase gas cleaners are product of Buflovak Equipment Division, Blaw-Knox Company, 43 Winchester Ave., Buffalo, N. Y.)

Check 1317 opposite last page.

Fast, low-inertia rotors in AC-motor line

Uses: AC-motor applications.

Features: Each motor has low-inertia fast-accelerating rotor. Rotor is constructed of pressure-cast aluminum. It is dynamically balanced to movement tolerances as precise as 0.0002".

Description: Integral hp AC

motors are available in sizes of 1 to 250 hp. They may be specified in all standard speeds and voltages. Designs include polyphase, ball-bearing, vertical, and horizontal mounting arrangements (with feet or footless) with NEMA C-face, D-flange, or P-base brackets.

Lubrication consists of double-shielded ball bearings and metering plate. Plate automatically regulates flow of proper amount of grease to bearings as needed.

Slot-cell insulation is laminated mylar paper. Cast-iron frame has 40°C temperature rise, continuous-duty, with 15% service factor. Conduit box is diagonally split to expose leads for connection.

(Duty Master motors are product of Master Electric Division, Reliance Electric and Engineering Company, 24701 Euclid Ave., Cleveland 17, Ohio.)

Check 1318 opposite last page.

Glass pipe and fittings serve to 450°F, 55 psi

Uses: Liquid-transmission applications.

Features: Pipe and fittings can be used in operations having temperatures to 450°F, with maximum sudden-temperature differentials ranging to 210°F. Maximum working-pressure range is 25 to 55 psi, depending on pipe size.

Description: Pipe and fittings are manufactured from borosilicate glass. They are completely interworkable and interchangeable with other tempered hard-glass transmission systems having same linear coefficient of expansion ($32 \times 10^{-7}/^{\circ}\text{C}$ [0-300°C]).

(Pipe and fittings are manufactured from KG-33 borosilicate glass which is product of Kimble Glass Company, Subsidiary of Owens-Illinois Glass Company, Owens-Illinois Bldg., Toledo 1, Ohio.)

Check 1319 opposite last page.

(Kimax glass pipe and fittings are products of Glass Products Division, Fischer & Porter Company, Hatboro, Pa.)

Check 1320 opposite last page.

our research is your reward

Speed... Quality... Economy in BATCH PROCESSING



Duradient burner setting

Built by Selas for a prominent chemical company, this enclosed setting, complete with manifolds and control panel, was shipped as a packaged unit ready to connect with fuel and process lines. A reactor fits snugly into setting with bottom 10 in. from burners. Precise control and placement of heat eliminate hot spots, increase reactor life.

with Selas Duradient® Heating

Control in uniformity of heat application and adherence to critical programming requirements are important features of Selas Duradient heating for batch cooking chemicals, oils, resins, varnishes, inks.

Fast, radiant gas heating, rapid burner response and turndown ratios of 15:1 or more, make Selas settings as versatile as they are controllable

... enable them to meet any time-temperature cycle within $\pm 2^{\circ}\text{F}$, and duplicate it, batch after batch.

Efficient, low-cost Duradient enclosed or open settings are steel-encased, shipped with all refractory in place for simple installation. "Packaged" equipment may include shop-assembled piping and complete, automatic control instrumentation.

Send for bulletin "Heat Processing Batch Liquids." Address Dept. 1410

Duradient is a registered trade name of Selas Corporation of America

SELAS
CORPORATION OF AMERICA
DREHMAN, PENNSYLVANIA

Heat and Fluid Processing Engineers
DEVELOPMENT • DESIGN • CONSTRUCTION



Check 1321 opposite last page.



LOW-COST, LONG-LASTING REPAIR
OF CONCRETE SURFACES WITH

new Penntrowel

Resigning yourself to a costly replacement job on worn-out or corroded concrete or cement surfaces in your plant? Don't call a contractor—*repair* those damaged areas with new Penntrowel surfacing compounds!

PENNTROWEL is a new kind of resin surfacing material. It's tough, impermeable . . . resists acids, alkalis, solvents . . . bonds inseparably to repaired surfaces to give you long, trouble-free service.

PENNTROWEL is easy and economical to use. No expensive equipment needed—you just trowel it on. No shut-downs—Penntrowel cures overnight for next-day service. And its cost is amazingly low.

PENNTROWEL has been proved on the job in Pennsalt's own plants. Its three specialized grades give top performance in all kinds of corrosion or wear applications.



WRITE TODAY

for Penntrowel Bulletin CP-627
and installation cost data.

**Pennsalt
Chemicals**
ESTABLISHED 1850

Corrosion Engineering Products Dept. 695
PENNSALT CHEMICALS CORPORATION
Natrona, Pa.

Penntrowel is a trade-mark of Pennsalt Chemicals Corp.

Check 1322 opposite last page.

ENGINEERING & SAFETY

**Fluids are halted
at 6000 psi**

Uses: For pneumatic and hydraulic systems.

Features: Valve will hold fluids at 6000 psi.

Description: Valve has renewable glass-filled Teflon seat to give bubble-tight shut-off. It is constructed of



Complete overhaul of needle valve can be accomplished without removal from line

AISI-303 stainless steel with Teflon O-rings.

Complete overhaul of valves can be accomplished without removal from line. Standard ports are female pipe NPT or female tube AND 10050.

(Model 816 valve is product of Dragon Engineering Company, Inc., Box 185, 13457 Excelsior Dr., Norwalk, Calif.)

Check 1323 opposite last page.

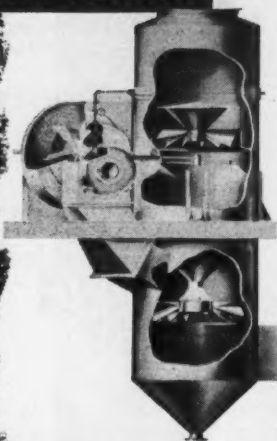
**Four-bolt accessibility,
for easy maintenance
of centrifugal pump**

Low-pressure stuffing box is also incorporated

Uses: Handling abrasive slurries of cement, sand, coal, chemical sludges, and plant wastes.

Features: Pump incorporates low-pressure stuffing box and four-bolt accessibility for easy maintenance. Relatively wide internal-pump area permits greater ranges in

**... in wet
dust control**



DUCON DYNAMIC WASHERS

**RECOVER DIFFICULT DUSTS
EFFICIENTLY AND ECONOMICALLY**

Ducon UW-4 Dynamic Wet Dust Collectors have added a new dimension in dust recovery. They have replaced, with outstanding success, many more costly and less effective dust collectors in the recovery of "difficult" materials, such as fine and abrasive dusts in kilns, rotary driers and other applications.

The UW-4 Washers are also ideal for high loading conditions where maximum efficiency is desired.

Ducon UW-4 Washers offer other unique advantages, including constant air capacity, low water consumption and rugged construction. They are self-cleaning and fire and explosion proof.

Send for Bulletin W-7456.



the
name in
DUST
CONTROL

**THE
Ducon COMPANY, INC.**
147 EAST SECOND STREET • MINEOLA, L.I., NEW YORK

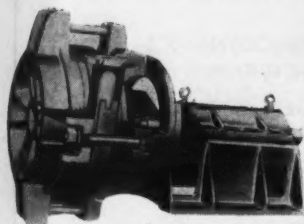
Check 1324 opposite last page.

CHEMICAL PROCESSING

ENGINEERING & SAFETY

certain cement and chemical-process applications.

Description: In centrifugal pump, wearing parts are reached without disturbing pipe. Rotating element is ad-



Relatively wide internal-pump areas permit greater ranges in certain cement and chemical-process applications

justable to compensate for wear. Liners on both sides of impeller are renewable.

Heavy outboard radial bearing provides extra capacity for high over-hung loads. Pumps are available in two- to six-inch sizes.

(Centrifugal pumps 6 RXW are product of Morris Machine Works, Baldwinsville, New York.)

Check 1325 opposite last page.

Fog coalescer fabricated from 12.0045" wires

Uses: Coalescing of fog, wherein particle size is under five microns.

Features: Coalescer is fabricated from 12.0045" diam wires, knitted in parallel.

Description: Fog coalescer is used in conjunction with mist eliminator which knocks back droplets after they have been coalesced into larger particles. Mesh can be fabricated in any alloy which can be drawn into wire.

(Metex fog coalescer is product of Metal Textile Corporation, Division of General Cable Corporation, 647 E. First Ave., Roselle, N. J.)

Check 1326 opposite last page.

Slow-speed motor, is introduced in single-sheet Form FM-650 — Brevel Products Corp., 601 W. 26th St., New York 1, N. Y.

Check 1327 opposite last page.

If your product is in this list new **super** series MILLS

WILL MULTIPLY YOUR PRODUCTION
IN LESS SPACE, AT LESS COST.



IT'S THE ADVANCED
ENGINEERING
THAT MAKES THE
BIG DIFFERENCE
IN:

GRINDING
DISPENSING
MIXING
EMULSIFYING
HOMOGENIZING
DISINTEGRATING

Let us prove it
in your plant
at no cost

Write today for
complete information

FOOD and kindred products including meat, dairy, fruit, vegetable, fish, bakery, confectionery, cooking fats, extracts, food preparations, etc.

TOBACCO end-products.

TEXTILE dyes, finishes and coatings.

LUMBER & WOOD coatings.

PAPER coatings and glazes.

PRINTING inks.

CHEMICALS and kindred products including organic and inorganic chemicals, drugs, medicines, pharmaceuticals, cosmetics, cleaning and polishing preparations, waxes, fertilizers and insecticides, etc.

PAINTS, VARNISHES, LACQUERS, ENAMELS and similar coatings.

PETROLEUM products including greases, oils, roofing materials, fuels, etc.

LEATHER dyes, special polishes, etc.

STONE, CLAY and **GLASS** Products.

CERAMIC slips, body materials and glazes.

METAL core washes, mold coatings and special protective coatings.

MISCELLANEOUS including pencils, crayons, carbon paper coatings, cork products, matches, etc.

RESEARCH LABORATORIES and similar services.



MOREHOUSE-COWLES, INC.

1150 San Fernando Road
Los Angeles 65, California

Representatives in principal cities
Convenient lease and time payment plans

Check 1328 opposite last page.

Cut Bagging Costs on Powdery Materials



Does it with Air . . .
No Moving Parts!

Faster . . . Cleaner . . . More Compact Filling of Large or Small Valve Bags

The revolutionary new AIR-PAC Bag Packer fills bags quickly to accurate weight by the use of a small amount of low pressure air. There are no moving parts — so long life is assured. Spout fits valve bags snugly . . . keeps bags clean . . . eliminates costly bag closing.

Call or write for full particulars . . . or if you pack granular, pellet or fibrous materials send for our AUGER-MATIC Packer Catalog.



E. D. CODDINGTON MFG. CO.
5036 NORTH 37TH STREET • MILWAUKEE 9, WISCONSIN

Check 1329 opposite last page.

VACUUM LAMMERT PUMPS



No matter what you need vacuum for, you will get dependable service from automatically lubricated Lammert pumps. Capacities—4.3 to 225 cubic feet per minute. From medium to high vacuum (up to 20 microns of barometer).

Write for catalog showing the complete line, including specifications, of Lammert pumps and compressors.

LAMMERT & MANN CO., INC.

1753 Walnut Street, Chicago 12, Illinois, SEeley 3-0383

Check 1330 opposite last page.

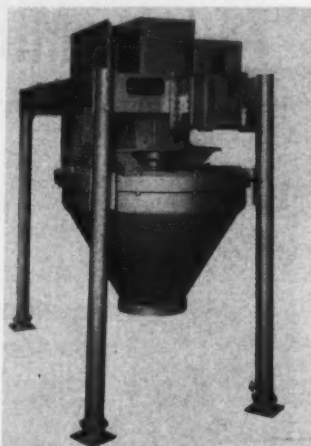
ENGINEERING & SAFETY

Explosion of 100 psi can be retained

Uses: In plants operating with pressure systems or those processing explosive materials.

Features: Mill will retain explosive force of 100 psi.

Description: Impact mill is designed to meet ASME Code 1956 for unfired pressure vessels. Safety blow-out may be



Impact mill is designed to meet ASME Code 1956 for unfired pressure vessels

added to hopper to permit specified pressure to be harmlessly dissipated.

(Explosion-proof Centri-Mill is product of Entoleter Division, Safety Car Heating & Lighting Co., Inc., 1175 Dixwell Ave., Hamden, Conn.)

Check 1331 opposite last page.

Pressure change of 1/4 lb adjusts dampers with regulator

Fuel economy is increased
by compensating device

Uses: Actuation of lever-operated balanced valves for pressure-regulating service—reducing or unloading.

Features: Regulator continuously maintains desired boiler pressure within narrow limits by automatically adjusting draft. Device moves damper on pressure changes of as little as 1/4 lb. It is equipped with compensating device

Your classic reference —
now thoroughly revised

CHEMICAL PROCESS PRINCIPLES

PART II: THERMODYNAMICS
SECOND EDITION

By **OLAF A. HOUGEN**, University of Wisconsin, **KENNETH M. WATSON**, Illinois Institute of Technology, and **ROLAND A. RAGATZ**, University of Wisconsin.

Entirely rewritten, 70% is new, and the book is almost 200 pages longer. It brings together the important chemical, metallurgical, and mechanical engineering applications for all phases of process design. Now covers supersonic fluid flow underlying thermodynamic principles of steam turbines, internal combustion engines, gas turbines, and jets.

1959. 568 pages. \$9.75

SEND NOW FOR YOUR ON-APPROVAL COPY

JOHN WILEY & SONS, Inc.
440-4th Ave., New York 16, N.Y.

Check 1332 opposite last page.

Here's Jerguson's

New! RED FLASHER TRUSCALE

Remote Reading Liquid Level
Gage

Jerguson Red Flasher Truscales have illuminated scale which starts flashing red if boiler water gets too high or too low. Red warning flashes continuously until the dangerous condition is corrected.

Truscales give remote reading of boiler or tank liquid level accurately to 1/2 of 1% of scale reading. Scale on convex face; 180° visibility; easy to read from any point from which face can be seen.

Flashing
Red
Scale
Warns
of
Danger



Protect valuable equipment with Jerguson Truscale Remote Reading Gages. Send for new 8-page bulletin which gives complete details.

Gages and Valves
for the Observation
of Liquids and Levels

JERGUSON

JERGUSON GAGE & VALVE COMPANY
100 Adams Street, Burlington, Mass.

Offices in Major Cities. In Canada: Peacock Bros. Ltd.
In England: Bailey Meters & Controls Ltd. In France: Centrale Bailey

See Booths 1211-1213 — Chemical Show
Check 1333 opposite last page.

CHEMICAL PROCESSING

a filter man's thinking

FORESIGHT:

Developing the solution before the problem comes up

It takes a long time to translate the need for a new aircraft into an actual piece of flightworthy hardware. It can take forever — if its special operating requirements can't be met by known materials and components. Few jets would be in the air today if certain industrials — like Purolator — hadn't recognized that difficult operating conditions had to be anticipated long in advance.

A modern aircraft has a maze of circulatory systems: fuel, air, lubrication, pneumatic, and hydraulic lines . . . instrument systems, etc. — with filters playing an

important role in each. In high performance jets extremes of temperature, pressure, flow and structural strain . . . and the need to handle chemically-active fluids . . . preclude the use of the kinds of filters which had proved adequate for older aircraft. To fill the gap, our engineers some years ago developed Purolator's famous porous metal filter medium. This type of filter has since been brought to a high degree of efficiency.

Purolator makes these media by a unique method of fusing metal powders of controlled particle size to obtain the desired porosity. The metals used are matched to specific service requirements — and include all grades of stainless steel, nickel, monel, Inconel, Hastelloy, bronze, gold, silver, etc.

We can fabricate these media into almost any shape you care to name. We can control pore size to within 10% even when down as small as 0.2 microns. We can sinter the elements to fittings of the same or other materials. We can vary wall thickness from .015 inches up. We can apply thin layers of porous metal to other types of media. We can squeeze 500 square inches of filter area into an element 3½ inches in diameter and 10 inches long.

Many of these filters can withstand pressures up to 6000 psi . . . temperatures from -420° to 1200° F. . . severe corrosive environments. In addition to aircraft, they're being widely used in chemical, nuclear, petroleum and other industries — for filtration, contamination control, separation of liquids, and diffusion applications.

"Filter Media Selection Chart"—giving corrosion and temperature factors for all known media—is a valuable reference to have on hand. Write us—it's yours free.

Jules P. Kovacs
Jules P. Kovacs, V. P.
Filtration For Every Known Fluid
PUROLATOR
PRODUCTS, INC.
Rahway, New Jersey and Toronto, Ontario, Canada

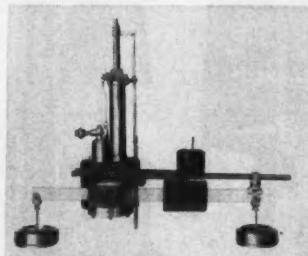
Check 1334 opposite last page.

OCTOBER 1959

ENGINEERING & SAFETY

which provides increased fuel economy and boiler efficiency.

Description: Hydraulic damper regulator also controls fans, stokers, and oil- and gas-control valves. It is suit-



Hydraulic damper regulator continuously maintains desired boiler pressure within narrow limits by automatically adjusting draft

able for use on any boiler that operates at pressures of 5 to 150 psi.

Regulator repositions dampers and lever-operated valves in response to small changes in controlled pressure. Adjustment of such pressure is made by adding or removing weights from lever of regulator. Minute changes are accomplished by repositioning of sliding weights.

(Hydraulic damper regulator 5000 is product of Atlas Valve Co., 280 South St., Newark 5, New Jersey.)

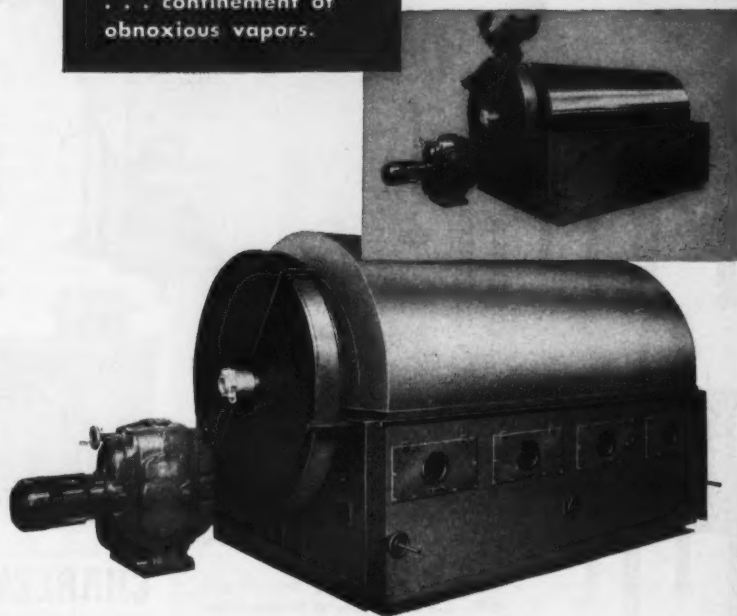
Check 1335 opposite last page.



"That's a nice arrangement of molecules!"

The Problem:

Protection against product contamination . . . confinement of obnoxious vapors.



G-B Supplied the answer with this INTERNALLY Jacketed Flaker

The unit shown is fitted with a G-B internally jacketed fabricated drum 60" diameter by 120" long having a polished chrome plated surface. A stainless steel steam jacketed feed pan and stainless steel vapor enclosure protect against product contamination and confine obnoxious vapors.

This is another application where G-B equipment was selected. More detailed information on request.



GOSLIN-BIRMINGHAM
MANUFACTURING CO., INC.
BIRMINGHAM, ALABAMA

FILTERS • EVAPORATORS
PROCESS EQUIPMENT
CONTRACT MANUFACTURING
including HEAVY CASTINGS

Check 1336 opposite last page.

PROFIT MARGINS INCREASE

WHEN THE BEST MIXER IS USED FOR EACH APPLICATION

There is only one Mixer that is the most efficient for each different mixing requirement — let us recommend the best Mixer for your use based on our wide variety of types and almost a century of experience.



- 1 Pint—5000 gallon sizes.
- Standard designs, or with any modifications required.
- Also Three Roller Mills, Dry Grinding Mills, and other types of Mixing, Grinding and Dispersing Equipment.

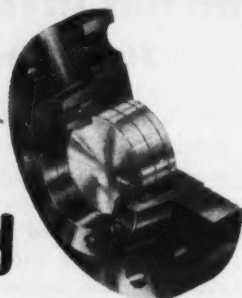
Write for complete information!

CHARLES ROSS & SON CO., INC.

Leading mfrs. of wet or dry grinding Mills, Kneaders and Mixers of all types—since 1869
154 CLASSON AVENUE — BROOKLYN 5, NEW YORK

Check 1337 opposite last page.

See
with
Safety



UNDER PRESSURE

WITH THE

PRES SURE

SIGHT GLASS AND MOUNTING

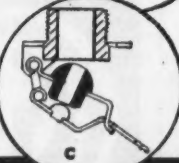
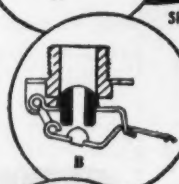
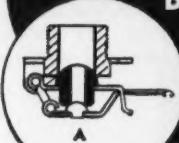
The rupture of sight glasses cannot be risked in the handling of expensive, inflammable, or dangerous liquids. The PresSure sight glass, with a double safety factor of 10-plus, i.e., a 300 lb. PresSure sight glass will withstand 3000 PSI, opens a greater range of applications for chemical, pharmaceutical, aeronautical, petroleum, food processing, and many other industries. PresSure can be used on new or present equipment; only one mechanical operation required for installation.

Write for descriptive folder giving full information.

PresSure Products Co., Inc.
Dept. 12, P.O. Box 424, Charleston, W. Va.

Check 1338 opposite last page.

The
uni/RAP
The ABC's of
Better
Trapping



Shown here is the "trigger-action" of the exclusive Dual Valve which produces faster warm up and tremendously increased capacity.

- A Steam pressure across the large valve produces a tight positive seal.
- B Weight of condensate opens small pilot valve slightly, instantly balancing pressure on both sides of main valve and opening it.
- C Large orifice of main valve quickly discharges air and condensate with minimum wear and wire draw. This greatly increases capacity and permits live steam to enter faster to speed warm up.

Order by pipe size (from 1/2" through 2"). Each size automatically adjusts to pressures from 0 to 250 PSI, simplifies ordering and inventory control. Write for Bulletin No. 800C

*Trade Name—Patented

"WHERE Good Connections COUNT"

PERFECTING SERVICE COMPANY, 332 Atando Ave., Charlotte, N.C.
Baltimore—Buffalo—Camden, N.J.—Chicago—Cleveland—Los Angeles
New York—Providence—Hamilton, Ont.—Montreal—Toronto

Check 1339 opposite last page.

ENGINEERING & SAFETY



Chlorine-absorption tower

. . . . at Brown Paper Company, Berlin, New Hampshire, utilizes vertical pipe runs of PVC. The PVC is used in connection with Day-Kesting-process production of chlorine dioxide for a recently completed Kraft mill bleachery.

Two four-inch-diam Schedule 80 lines (extreme left) carry sodium hydroxide-sodium hypochlorite through lute to chlorine-absorption tower. Six-inch-diam Schedule 80 line carries liquor overflow from tower-head tank feed.

Many lines like these have 90° vertical rise in tower section of this plant. Concentration of sodium hydroxide is initially 7%. It reduces to 3 g/l of caustic and 52 g/l of available chlorine. Temperatures are ambient.

(PVC pipe is supplied by A. M. Byers Company, Farnam Clark Bldg., Pittsburgh, Pa.)

Check 1340 opposite last page.

Safe motor controllers of squirrel-cage type are oil-immersed

Clear oil-level sight gage is recessed

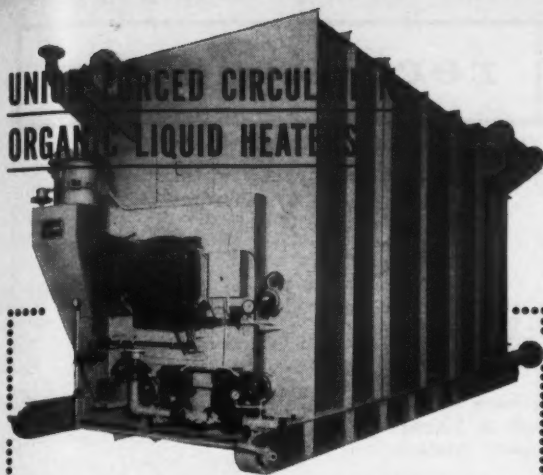
Uses: Motor-control applications in hazardous and semi-hazardous locations.

Features: Explosion-proof units are corrosion-resistant and weather-proof. Oil-level sight gage is recessed for protection.

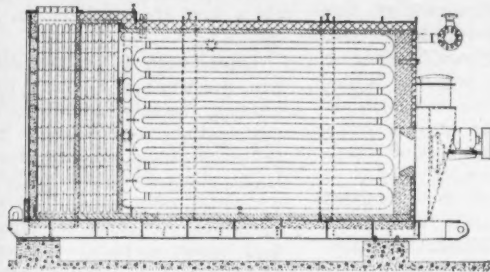
Description: Oil-immersed squirrel-cage motor control-

CHEMICAL PROCESSING

ENGINEERING & SAFETY



10,000,000 BTU/hr. FORCED CIRCULATION LIQUID HEATER. Fully automatic. Gas and oil fired. Packaged unit with Union combustion control and flame safeguarding system for precise temperature control.



SHOP ASSEMBLED UNITS INSTALLED WITHOUT COSTLY FIELD BALANCING

Right from the start, you can save with a Union shop assembled Forced Circulation Heater. With all of its circuits of the same hydraulic length, time consuming field balancing can be eliminated. Most units do not require orifices or any other mechanical adjustments to equalize flow at the time of installation.

High liquid velocities (8 to 10 ft./sec.) and liberally proportioned, water cooled furnaces eliminate localized overheating. As there are no multi-tube circuits in the radiant section, recirculation within a circuit is impossible, thereby eliminating vapor binding or stagnant flow areas.

Liquid and gas flow run counter to each other. With the liquid inlet positioned at the top of the convection section, the lowest temperature liquid is served by the lowest temperature gas. As a result, heater efficiency is improved and the risk of thermal shock minimized.

Standard units (both shop assembled and field erected) can be modified to meet a wide range of job requirements. They can be arranged for firing with most commercial fuels as well as waste fuels in liquid or gaseous form.

For specific information, outline your requirements to a Union representative or contact Union Iron Works.

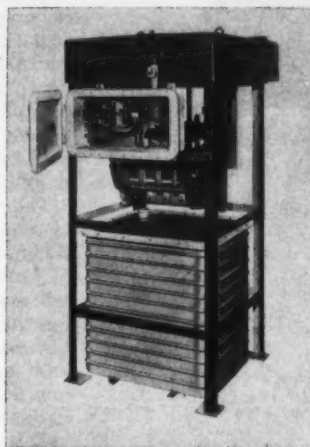


UNION IRON WORKS • ERIE, PENNSYLVANIA

Check 1341 opposite last page.

lers are rated at 50-mva interrupting capacity. These NEMA Class E1 starters provide built-in short-circuit protection to a motor on systems having maximum of 50-mva capacity.

Starters are available in two types. One is floor-mounted lift-out model with all components immersed in oil (5911). Second style is frame-mounted tank-lowering unit with high-voltage components immersed in oil and low-voltage control components mounted in explosion-proof air boxes (5912).



Frame-mounted tank-lowering type controller with tank fully lowered

Segregated high- and low-voltage panels and components are incorporated. Units also have adjustable over-current relays for short-circuit protection and domed heads for fast run-off of water and corrosive liquids.

(Classes 5911 and 5912 motor controllers are products of Allis-Chalmers Manufacturing Company, 864 S. 70th St., Milwaukee 1, Wis.)

Check 1342 opposite last page.

Safe sulfur practices are outlined in 15-page booklet, giving unloading instructions, physical properties, engineering control, employee safety, and many other aspects of the problem. Copies of Safety Data Sheet may be obtained at \$0.30 each from Manufacturing Chemists' Association, Inc., 1825 Connecticut Ave., N. W., Washington 9, D. C.

Checked 'em all ... got
Far more for My Money
when I bought this terrific new
RIGID. 535
Pipe & Bolt
Threading
Machine



Pats. Pending

Complete with 1 Universal Die Head, 2 Sets of Dies for 1/2" to 2" pipe or conduit

Looks good, does better. Perfect cutting, reaming, threading fast . . . and easy! Three tools operate independently . . . swing up out of the way for short pipe chucking from front. Slip-proof Speed Chuck is a great performer. Concealed oil system, automatic shut-off nozzle. Quick-opening die head sets to size right in machine. Power? . . . **RIGID**-built motor handles 2" pipe, conduit, bolt, rod—and 12" geared tools easily. Try it, compare it . . . and you'll understand its enormous popularity! Leg and wheel stands available. At your Supply House.

Time savings
on just 3 large
jobs more than
paid the \$460⁰⁰
price!



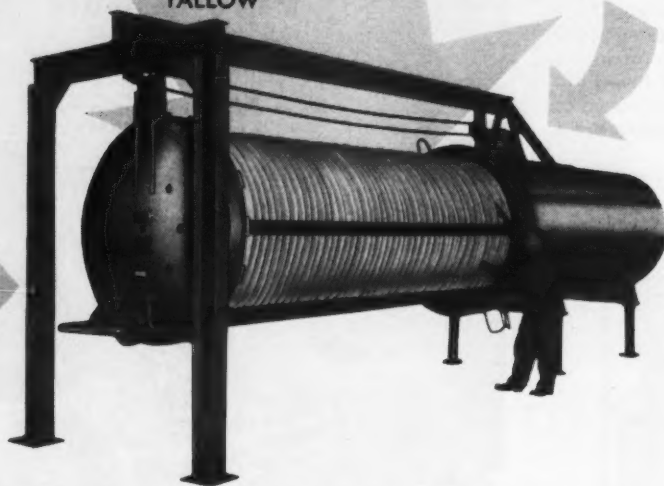
The Ridge Tool Company

Elyria, Ohio, U.S.A.

THREADED PIPE... It's Tight... It's Best... Costs Less!

Check 1343 opposite last page.

ANTIBIOTICS • GELATIN
WAXES • BEER • SUGAR
VEGETABLE OILS
PECTIN • RESINS
GLYCERINE • ACIDS
WEED KILLERS • SULPHUR
CAUSTIC SODA
TALLOW



filtration problems point to this solution...

Used in a wide variety of processing industries, versatile NIAGARA Filters provide highly efficient, economical separation of solids from process streams of from 5 to over 1,000 gallons per minute per unit. Time-saving and product-improving benefits result from these NIAGARA features:

One-man operation of several units

Less than 10 minutes required for cake removal

Cloth (when required) generally needs no manual washing

Totally enclosed construction for safety with hazardous solutions and greater cleanliness

For special NIAGARA Filters to meet your exact specifications, describe your problem in a letter to:

Niagara® FILTERS

A DIVISION OF

American Machine and Metals, Inc.

Dept. CPN-1059, EAST MOLINE, ILLINOIS
(Niagara Filters Europe: Kwakelpaad 28, Alkmaar, Holland)
Specialists in Liquid-Solids Separation

Check 1344 opposite last page.



recent books

reviews of current technical and reference work
... summarized for you by authorities in the
field with the CP staff

Journal of Applied Polymer Science

Reviewed by
DR. KARL H. LAUER
University of Alabama

The first issue (127 pages) of the Journal of Applied Polymer Science shows the same high standards of the Journal of Polymer Science to which it is an adjunct. Without question, the two journals belong together and cover a field the development of which is still in its youth.

The names of the members of the editorial board (L. Bateman, H. Dillon, H. Mark, M. Morton, and F. Patat) foretell a continuing high quality for the journal.

A distinction between pure and applied science always implies a certain danger, but unquestionably this new journal, which is to be published bimonthly with two volumes annually, will help the interested reader to obtain firsthand information about theoretical developments in the applied field.

To obtain the "Journal of Applied Polymer Science" for one year, remit \$35 direct to Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, New York.

Check 1345 opposite last page.

An Introduction to Chemical Engineering

As pointed out at the very beginning of this book, it is written primarily as a beginning text for students in chemical engineering or related professions. The volume has 15 chapters and a total of 271 pages. None of these delve into chemical engineering theory.

Written by Dr. Charles E.

Littlejohn and Dr. George F. Meenaghan, both of the Department of Chemical Engineering, Clemson College, Clemson, S. C., the work deals mainly with basic fundamentals upon which theory is based. The authors reason that these must first be mastered before a study of unit operations and thermodynamics is begun.

Topics such as professionalism, the work of chemical engineers, society membership, registration, ethics, and intellectual tools are discussed. Later chapters deal with fundamental dimensions, process variables, mixtures of vapors and gases, material balances, dimensional analysis, economics, and other fundamentals.

Thirteen useful appendixes are at end of book. Problems are listed throughout the various chapters.

To obtain "An Introduction to Chemical Engineering" remit \$7.80 direct to Reinhold Publishing Corp., 430 Park Avenue, New York 22, N. Y.

Chromatographic Reviews

Reviewed by
JOHN A. DEAN
University of Tennessee

This monograph consists of nine reviews, seven of which have appeared previously in the "Journal of Chromatography". There are two chapters on general techniques: Chromatostrips and Chromatoplates by E. Demole and High Voltage Electrophoresis by H. Michl; and two chapters on inorganic separations: Paper Chromatography of Inorganic Phosphorus Compounds by H. Hettler and Separation of Isotopes by Chromatography and by Electrophoresis by M. Chemla.

Remainder is on organic

compounds: A Method for the Paper Chromatographic Separation and Identification of Phenol Derivatives, Mould Metabolites, and Related Compounds of Biochemical Interest by L. Reio, Methods for the Separation of South American Strychnos and Indian Curare Alkaloids by G. B. Marini-Bettolo and G. C. Casinovi, Chromatography of Sterols, Steroids, and Related Compounds by R. Neher, Paper Chromatography of Chloroplast Pigments by Z. Sesták, and The Chromatographic Identification of Anthocyanin Pigments by J. B. Harborne.

Generous with illustrations, the 276 pages include a comprehensive subject index with entries for most of the information itemized in the 114 tables. The user will profit by the wealth of information gathered together through 1958 in these excellent reviews.

To obtain "Chromatographic Reviews, Vol I", remit \$8.75 direct to D. Van Nostrand Company, Inc., 120 Alexander Street, Princeton, New Jersey.

Check 1346 opposite last page.

Magnesium and Its Alloys

Reviewed by
DR. NIELS ENGEL
University of Alabama

"The Physical Metallurgy of Magnesium and Its Alloys," by G. V. Raynor, is a solid contribution to knowledge about the metal. Facts are explained on a rather theoretical basis but they are presented in a manner that metallurgists without training in electronic theories can easily understand.

Essentially three fields are covered: properties of pure magnesium, deformation of magnesium, and magnesium alloys. Corrosion is discussed in the chapter headed "Systems Formed by Magnesium with Gaseous Elements and Compounds."

Most important feature of the 531-page book is the fin-

ished presentation of a systematic treatment of magnesium alloys, which the author has approached through a series of publications. This treatment is viewed from different angles, such as the influence of alloying elements on solid solubility, on forming eutectics, on formation of intermediate phases that emphasize electron concentration, or as the influence of the elements of Groups I and II of the periodic table on the type of alloys formed when magnesium is the base metal.

To obtain "The Physical Metallurgy of Magnesium and Its Alloys," remit \$12.50 direct to Pergamon Press, Inc., 122 East 55th St., New York 22, N. Y.

Check 1347 opposite last page.

Air Pollution Control

Written in an easy-to-read style, this book should be of interest to all persons concerned with the problems of air pollution. Authored by Dr. W. L. Faith, managing director of the Air Pollution Foundation in Los Angeles, California, the 259-page volume provides authoritative information useful to both technical and non-technical personnel.

The book consists of nine chapters and covers all the important aspects of air pollution. Included are: effects of weather, methods of measuring air contaminants, discussion of pollutants, applicable control methods, and legal aspects. Additional reading references are listed at end of each chapter. Five-page appendix lists conversion factors for common air pollution measurements.

Mentioned also, are newer aspects of air pollution, including automobile exhaust problem and radioactivity hazard. The book is well illustrated with photographs, tables, charts, and drawings.

To obtain "Air Pollution Control" remit \$8.50 direct to John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, New York.

Check 1348 opposite last page.



THIS *direct drive* **BIFURCATOR® FAN**

*installed in duct makes fume removal
an inside job*

Installed directly in ductwork, space-saving DeBothezat Bifurcator Fans provide efficient direct drive power for fume removal.

Damaging fumes are kept away from the motor by a housing of acid-resistant metal alloy or of steel protectively coated with PVC (plasticized polyvinyl chloride) and many other types of synthetic linings. Fan wheels can also be made with similar anti-corrosion protection.

Save Installation Dollars

Installing a DeBothezat Bifurcator Fan is about as quick and simple as putting in a section of ductwork. Direct drive eliminates recurring maintenance problems. From space-saving installation to long-term operating economy, DeBothezat Bifurcator Fans keep costs down all the way. Contact a DeBothezat representative for further details or see our section in Sweet's Plant Engineering File.

De Bothezat™ FANS

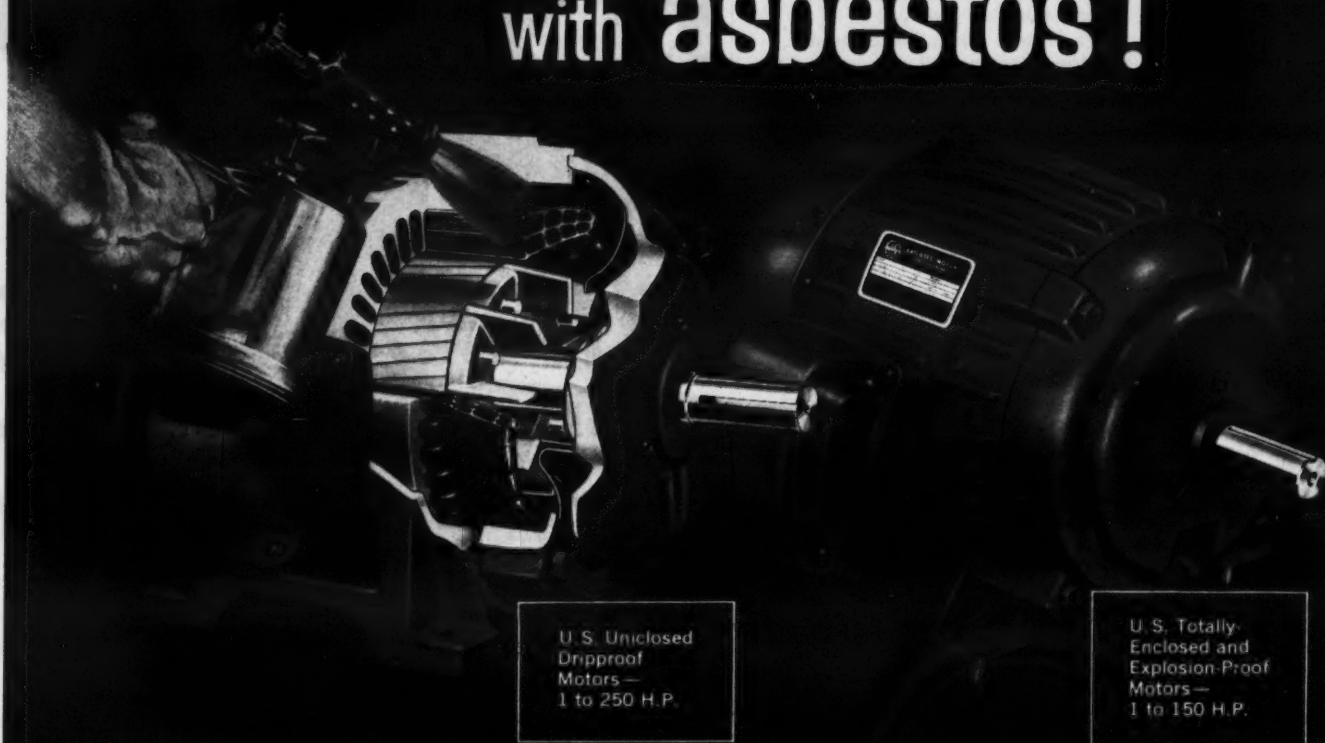
A DIVISION OF
American Machine and Metals, Inc.
EAST MOLINE, ILLINOIS



Check 1349 opposite last page.

only U. S. MOTORS

insulates all windings
with **asbestos!**



U. S. Unclosed
Dripproof
Motors —
1 to 250 H.P.

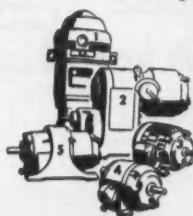
U. S. Totally-
Enclosed and
Explosion-Proof
Motors —
1 to 150 H.P.

your best protection

against motor burn-out
and production shut-downs

Only U.S. offers this protection! ALL windings insulated with asbestos—nature's million-year-old insulating material that *cannot carbonize!* Many motor makers use varnished paper, cloth, oiled linen, pressboard, fish-board—even insulating varnish alone. All these will carbonize...not one is fire-proof!

Only the original, patented U.S. ASBESTIC PROCESS—gives you: 1—*heat resistance*... can't carbonize, 2—*heat conductance* better than any cellulose material, 3—*moisture resistance*... due to exceptional impregnation and coating of all motor windings. Protect against costly production stoppages due to motor burn-out! Specify: "U.S. Motors"!



U.S. ELECTRICAL MOTORS INC.

BOX 2058, LOS ANGELES 54, CALIFORNIA
OR MILFORD, CONNECTICUT

U.S. MAJOR MOTOR LINES INCLUDE:
1. Vertical Solid & Hollowshaft, 2. Varidrive, 3. Totally-Enclosed,
4. Unclosed, 5. Synchrogear. Also, many other special motors.

FREE COLOR-ILLUSTRATED BROCHURES...
For specific data on asbestos protection, write for General
and Type H Unclosed Bulletins.



RECENT BOOKS

Soviet Reviews of Nuclear Science

Edited by R. A. Charpie and J. V. Dunworth, this 108-page book does a splendid job of describing recent developments of nuclear energy in the Soviet Union. The volume contains translations of eight articles published in the Soviet journal *Atomnaya Energiya*.

Table of contents reads as follows: The development of atomic energy in the Soviet Union, the uranium-graphite reactor and superheated steam power stations, graphite in nuclear reactors, the efficiency of atomic power stations, high-energy particle research, interaction of slow neutrons with nuclei, use of radioisotopes, and Soviet radiochemistry.

The book has a total of 23 photographs, 15 tables, and 51 figures. Each paper is supplemented with references. The work is recommended for all those interested in the nuclear field.

To obtain "Soviet Reviews of Nuclear Science" remit \$5.00 direct to Pergamon Press Inc., 122 East 55th Street, New York 22, New York.

Check 1351 opposite last page.

Biochemical Engineering

Reviewed by
ROBERT S. INGOLS
and PETER E. GAFFNEY
Applied Biology Department
Georgia Institute of
Technology

This 328-page book points out that although production of simple chemicals such as alcohol by microorganisms cannot compete with the lower cost of strictly chemical processes, many complex organics are produced biologically with less expense and in some cases are obtained only in this manner.

Fermentation has been used for centuries as an art or pseudo science at the most. The book, by R. Steel, Manchester (Eng.) College of Science and Technology, illus-



CONDENSER AND HEAT EXCHANGER CLINIC

Edited by David S. Hibbard, Metallurgical Engineer
The American Brass Company, Buffalo 5, New York

New controls and services meet increasingly critical requirements in heat-transfer units

As steam cycles in turbines become more complex—and operating temperatures and pressures rise—the job of the heat-transfer equipment becomes increasingly critical. Nuclear energy plants place tremendous emphasis on continuity of service for even conventional components like condensers. And in many processing plants the cost of shutdowns may range from exorbitant to disastrous.

Assurance that tubes will meet service requirements becomes increasingly important. And The American Brass Company has augmented its normal quality controls with tests and services to help makers of heat transfer equipment prevent possible trouble before it starts.

Electronic inspection. All tubes are inspected visually one at a time, both internally and externally. However,



All tubes are inspected visually one at a time, both externally and internally.

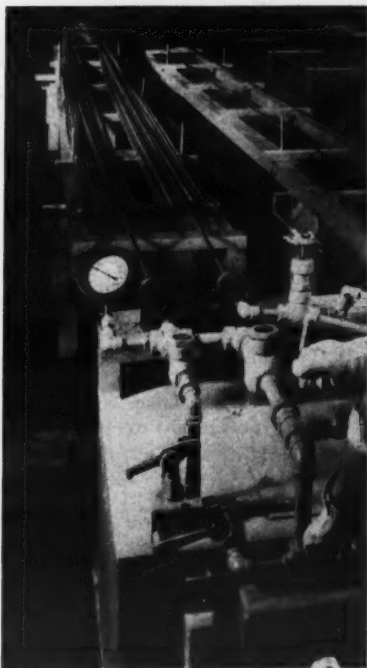


When required, tubes are inspected by eddy-current equipment, located at the tube straightener.

where greater assurance is required, the tubes—in straight lengths up to 100'—can be inspected electronically by eddy-current equipment.

Hydrostatic testing. As most U-bend tubes are used in applications involving high temperatures and pressures, all of these tubes are tested hydrostatically—after bending—at ASTM Specification pressures. They can, however, be tested at ASME Code pressures, up to 6000 psi, on request, if the tube size is such that it will withstand the pressure.

Relieving stresses. All U-bend tubes, other than copper, are annealed at the bend area after bending, to eliminate the hazard of stress-corrosion cracking which might occur in service due to stresses that may exist as a result of the bending.



All U-bend tubes are tested hydrostatically at ASME Code pressures—or higher, if necessary.

Duplex tubes are widely used in chemical plants and petroleum refineries to meet diverse combinations of corrosive action and/or pressure and temperature. Recently designers have selected them for use in air-removal sections of electric-power-plant condensers where corrosion is very severe.

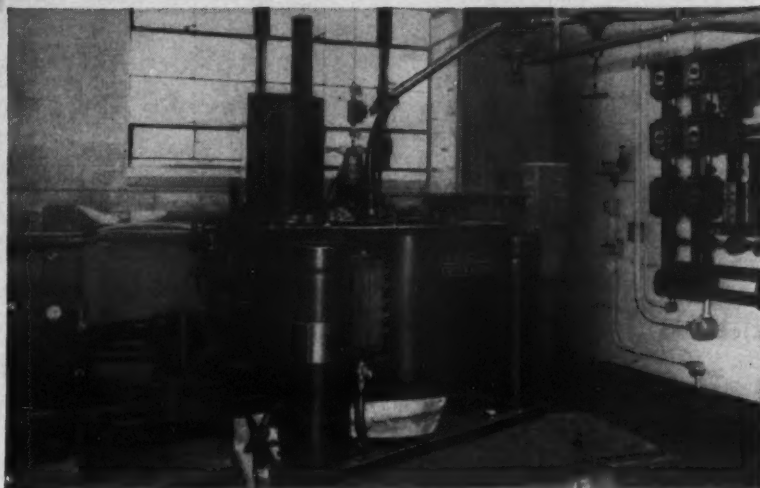
Broadest service. In helping manufacturers and users of heat-transfer equipment meet day-to-day problems, The American Brass Company has a broad background in the latest developments in heat-transfer equipment's expanding role. And with new mill equipment now in place, it offers the broadest service available in tubes for heat-transfer equipment. For technical assistance in special problems, write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

ANACONDA®

TUBES AND PLATES FOR
CONDENSERS and HEAT EXCHANGERS

Made by
THE AMERICAN BRASS COMPANY

Check 1352 opposite last page.



The automatic solution to centrifugal processing is **BATCH-O-MATIC®**

Completely automatic, the Tolhurst BATCH-O-MATIC speeds processing and assures product uniformity. For flexible programming, the control panel provides variable speed and time adjustments to exactly duplicate any cycle of operations. Compare these BATCH-O-MATIC advantages:

"CENTER-SLUNG" SUSPENSION — Tolhurst's exclusive "Center-Slung" mounting provides for the handling of greater out-of-balance loads! This allows easy processing of unbalanced loads. Less costly foundation is required.

BOTTOM DISCHARGE — Bottom opening allows solids to be discharged in seconds, cutting cycle time and freeing the machine for extra daily hours of centrifuging.

VARIABLE BASKET SPEEDS — Variable hydraulic drive provides adjustable feeding, extracting and unloading speeds. Crystal damage is virtually ended through low speed unloading.

LOW, COMPACT DESIGN — Minimum height is a valuable feature when head room is at a premium.

MAIL COUPON TODAY

Tolhurst® CENTRIFUGALS

A DIVISION OF
American Machine and Metals, Inc.
Specialists in liquid-solids separation

Dept. CPT 1059, EAST MOLINE, ILLINOIS

Please send illustrated details on the BATCH-O-MATIC. (I'd also like information on Tolhurst manual models ☐).

NAME _____

FIRM NAME _____

ADDRESS _____

CITY & ZONE _____

STATE _____

Check 1353 opposite last page.

RECENT BOOKS

trates that fusion of microbiological and engineering talents has created a truly scientific endeavor destined to be of great benefit.

Variables involved in both aerobic and anaerobic processes are covered from the practical as well as theoretical standpoint.

Important factors affecting rate of formation of desired product are presented in detail, along with known techniques of controlling these factors and a discussion of aspects where research is needed. Included is an excellent discussion of the difficulty of supplying a large amount of food for rapid biological development while still supplying the organism with an adequate amount of oxygen — because of the effect of the food on the rate of oxygen solution in aerobic systems.

Finally, methods and economics of product recovery are given careful attention.

To obtain "Biochemical Engineering — Unit Processes in Fermentation," remit \$7.50 direct to The Macmillan Co., 60 Fifth Ave., N.Y., N. Y.

Check 1354 opposite last page.

The Chemistry of Industrial Toxicology

Reviewed by
EDWARD G. SIMPSON
Dublin, Virginia

As author Hervey B. Elkins points out in the preface to this second edition, the most important step in the prevention of many occupational illnesses is control of fumes or dust. This 452-page book treats the problems of industrial poisons primarily from the point of view of the chemist and engineer.

After a general discussion of fundamentals and evaluation of hazards, the author devotes eight chapters to classification and discussion of various actual and potential industrial poisons. Under each item are outlined harmful effects of exposures that frequently occur in industry, probable seriousness of vari-

ous degrees of exposure, maximum allowable concentration, and best method for determining whether or not workers are subjected to harmful exposures. Radioactive isotopes and insecticides are covered.

A section on various air-sampling devices is followed by an excellent chapter covering analytical methods and procedures for air and body fluids.

To obtain "The Chemistry of Industrial Toxicology," remit \$11.50 direct to John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y.

Check 1355 opposite last page.

Catalysis

Reviewed by
DANA S. DAVIS
Athens College

Paul H. Emmett, the W. R. Grace professor of chemistry at Johns Hopkins University, has edited a series of presentations on catalytic processes. The extent of his efforts now appear in six excellently compiled books.

Volumes I and II take up the fundamental principles of homogeneous and heterogeneous catalysis. Volumes III, IV, and V discuss hydrogenation and dehydrogenation, coverage of the Fisher-Tropsch synthesis, and topics on oxosynthesis, cracking, hydrodesulfurization, and hydrogen isotope exchange.

Volume VI has 706 pages and 230 well-arranged tables. Short historical introductions precede each chapter and illustrate the economic importance of industrial catalysis. The primary concern of this text, however, is to relate the part played by acid catalysts in hydrocarbon reactions.

Catalytic alkylation of paraffins, catalytic isomerization of hydrocarbons, mechanisms of polymer formation and decomposition, polymerization of olefins, catalytic cracking, and catalytic reforming of pure hydrocarbons and petroleum naphthas are the major topics covered in Volume VI.

Good author and subject in-

dexes are found at the back of the book. The eleven contributing authors are to be congratulated for their thoroughness since some 1200 literature references are cited.

To obtain "Catalysis, Volume VI," remit \$19.50 direct to Reinhold Publishing Corporation, 430 Park Avenue, New York 22, N. Y.

Physical Constants and Chemical Structure

Reviewed by
LESLIE A. GUILDNER
Massachusetts Institute of Technology

Summarizing the results of years of effort, Professor H. I. Waterman, in collaboration with C. Boelhouwer and J. Cornelissen, shows that structure and other properties of naturally occurring solutions of fats and oils can be determined by the appropriate choice of physical and chemical properties — refractive index, density, and molecular weight, for instance.

The method of analysis, presented graphically, is statistical, where the various properties have been correlated against direct analytical results. Prediction of the structure of an unknown may be in serious error if assumptions as to the type of compound are not fulfilled. The method is widely applicable for complex natural solutions because the same types of compounds are generally found.

The graphical statistical approach can be used for other materials. Application to glass and heterogeneous catalysts is demonstrated; similar correlations can be developed in other fields (such as plastics).

For convenience, six nomograms given in this 120-page book are also furnished as separate inserts.

To obtain "Correlation Between Physical Constants and Chemical Structure," remit \$5.25 direct to D. Van Nostrand Co., 250 Fourth Avenue, New York 10, N.Y.

Check 1356 opposite last page.

Steam trap dependability is a matter of what the manufacturer puts into the trap

ARMSTRONG TRAPS ARE DESIGNED AND MADE TO GIVE YOU DEPENDABILITY

1. Efficient, proved operating principle



Armstrong Traps provide the most advanced development of the time-proven inverted bucket principle. Simple, but effective, there isn't much that can go wrong.

2. Good design



Armstrong Trap design gives big capacity in a small package. The mechanism is virtually fool-proof. All body styles are easy to inspect and maintain without removal from the line.

3. Highest quality materials of construction



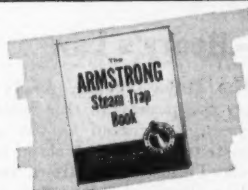
Only the best goes into Armstrong Traps. Bodies are close grained 30,000 tensile iron castings or high quality forgings. Working parts are all tough, corrosion resistant stainless steel.

4. Good workmanship



Armstrong Traps are made by craftsmen who take pride in their work. Careful inspection and frequent checking insure the quality of the trap.

5. Application know-how



Your problem has probably been solved already in the extensive experience of the Armstrong engineering and sales organization. You can be sure of sound, dependable recommendations.

Your local Armstrong Representative can show you what Armstrong dependability can do for you. Call him today or write direct.



860 Series for low pressure heating service.



800 Series, side inlet, side outlet.



No. 801, side inlet, bottom outlet.



880 Series, integral strainer.



200 Series, bottom inlet, top outlet.



Forged Steel Series for high pressures, high temperatures.



The 48 page Armstrong Steam Trap Book tells how to correctly size, install and maintain steam traps for any pressure, any temperature, any load plus full catalog data on Armstrong Steam Traps. Ask for Catalog K.



ARMSTRONG MACHINE WORKS

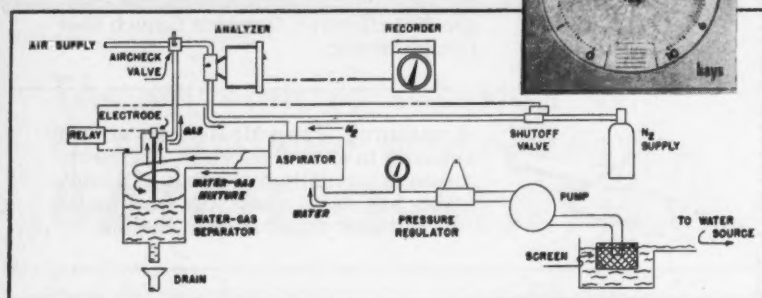
8804 Maple Street Three Rivers, Michigan

SEE OUR CATALOG IN CHEMICAL ENGINEERING CATALOG

Check 1357 opposite last page.

~~PREVENT~~ "WATER POLLUTION"

New Hays Dissolved Oxygen Meter Gives Instantaneous and Continuous Record of Dissolved Oxygen Content of Surface Water Effluent



For industrial plant and municipal use

In the overwhelming majority of cases when fish or other marine life have been killed by "Water Pollution", investigation has proven that the cause is a lack of dissolved oxygen in the water. Therefore in order to guard against causing difficulties of this nature and, to protect themselves against unfounded accusations, industrial operations such as chemical plants, paper mills, and refineries, as well as municipal sewage

systems, have long searched for a dependable, simple method of measuring the dissolved oxygen content of effluent discharge from their plants.

Hays now presents a dependable instrument which has proven its ease of operation and reliability in extensive tests at industrial and municipal installations. The unit can be very simply installed. It gives the operator a constant 24 hour check and record of the dissolved oxygen content of the water in percent saturation, measured at the point where the effluent leaves the plant to join the stream.

Basic operating principle—Henry's Law

The operation of the system is shown in the schematic diagram above. Its basis of operation may be found in Henry's Law which states essentially: "The amount of oxygen dissolved in water is directly proportional to the partial pressure of the oxygen above the water surface."

A continuous sample of water to be analyzed is pumped through the aspirator. Suction developed here produces a rapid circulation of gas through the system. A minute quantity of nitrogen added at this point maintains system pressure above atmosphere. At the separator, water passes to drain while the gas is directed to the analyzer. Here the oxygen content of the gas is analyzed in percent by volume, results being indicated on a standard recorder calibrated to read directly in percent saturation.

The system uses components developed by Hays and proven in years of

service. The Hays Oxygen Analyzer, the primary component of this system, has long been recognized as the outstanding instrument for industrial oxygen analysis. Thousands of them are in use in leading chemical companies, steel mills, power plants and other industries.

For complete information, including reprints of technical articles detailing successful tests, write today.

hays
CORPORATION

MICHIGAN CITY 12, INDIANA

Check 1358 opposite last page.

Management Morale

From page 23

4. Be objective and fair in any personal appraisal you may be required to make regarding your subordinates or with respect to your associates or superiors. A thoughtless comment on your part regarding another individual can be a factor in his or her progress.

5. Be sure that your job is not running you to the extent that insufficient opportunity is provided for your day-to-day relationships with people and specifically the opportunity to counsel with and discuss matters of mutual interest with those reporting to you.

6. Remember that we are no stronger individually than our contribution to the collective effort.

Little Things Count

Good morale is made up of a lot of little things and is seldom the result of any fancy or high-powered program. These little things are generally those pertaining to you and me, and each of us has the responsibility of making sure that we carry our part of the load.

Part of that responsibility is the recognition that we are all human and when others make mistakes don't sit in judgment upon them, but just work a little harder in keeping our own backyard clean.

The fruits of good morale are well worth the effort expended. Regardless of how far each of us individually may progress up the management ladder, never lose sight of the fact that each of us has a wonderful opportunity at all times to make a deep and lasting imprint on those with whom we come in daily contact.

Rare earth handbook is a 214-page compendium of data on physical, crystal, chemical, mechanical, electrical, magnetic, nuclear, and thermodynamic properties of each of the 15 rare earth metals, as well as for yttrium. "The Properties of the Rare Earth Metals and Compounds," priced at \$10, may be obtained from the Rare Earth Research Group, Battelle Memorial Institute, 505 King Ave., Columbus 1, Ohio.

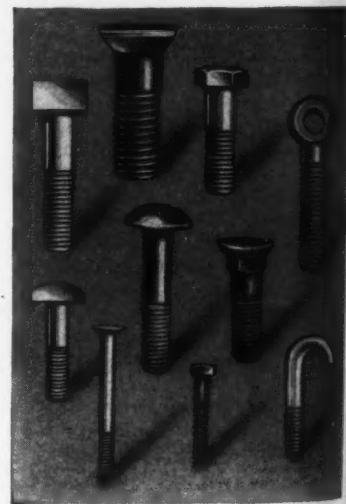
Uniform
Class 3 Fit

**BOLTS
NUTS
STUDS**

TITANIUM

- Carbon Steel
- Alloy Steels
- Stainless Steels
- Silicon Bronze
- Naval Brass
- Monel Metal

You can depend on a uniform Class 3 fit if required when you buy Pawtucket threaded fasteners. Standard items or specialties — all Pawtucket products are accurately made in standard dimensions or to your specifications. Heat treating with precision-controlled modern equipment.



BETTER BOLTS SINCE 1882

PAWTUCKET
MANUFACTURING COMPANY

327 Pine St. Pawtucket, R.I.
THE PLACE TO SOLVE YOUR BOLT PROBLEMS
T.M. REG.

"The Bolt Man"

Check 1359 opposite last page.

CHEMICAL PROCESSING

THAT'S
INTERESTING

Filt gun

Fumes from an unopened bag of insecticides left in a large laboratory overnight killed most of the adult mosquitoes confined there. Even when the insecticide was enclosed in a paper bag with a PE liner, the "death rate" soared, reported scientists at the Communicable Disease Center, Savannah, Ga.

Ceramic magnets

Ceramic magnets that, weight for weight, have up to three times the power of iron magnets have been developed by Boeing Airplane Company.

Even at high temperatures they have been found to retain their strength.

Magnets are made by mixing two powdered metallic oxides—such as iron and barium—and the magnetic field is induced while ceramic is being formed under heat and pressure.

For more information on product at right, specify 1360 see information request blank opposite last page.



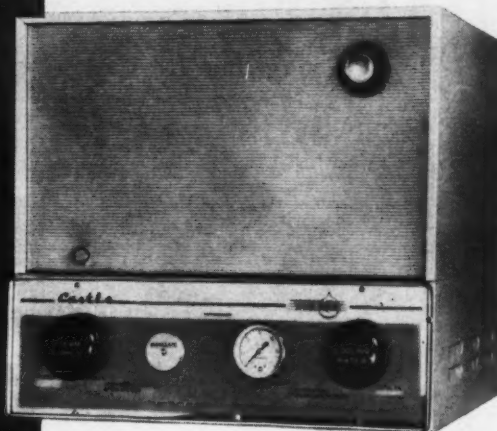
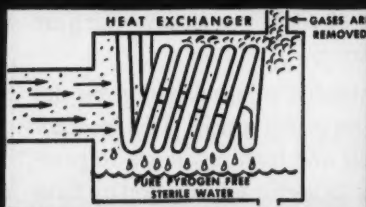
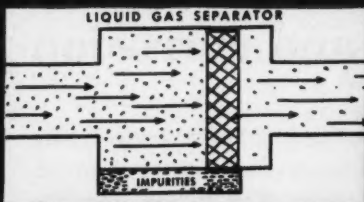
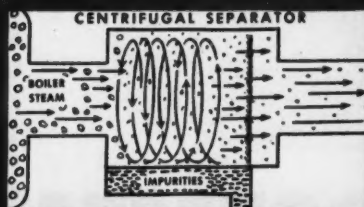
CES

Now – Pure, Pyrogen-free Sterile Water DIRECT FROM BOILER STEAM

STERIL-AQUA® is not to be confused with ordinary water stills. The Castle STERIL-AQUA System uses a completely new concept to produce high purity water.

No conventional still has these advantages.

1. **Straight-Thru Process**—uses direct raw boiler steam. Eliminates secondary heating.
 2. **Capacities**—5-500 gallons per hour. Operates at and produces continually its rated capacity.
 3. **Maintenance**—direct process eliminates complex components. All components housed in single frame.
 4. **Product**—meets all USP standards for pure, pyrogen-free sterile water.
 5. **Space Saving**—STERIL-AQUA averages 1/5 size of comparable capacity conventional units.
- RESULT: LOW COST!** Pure, pyrogen-free, sterile water at a fraction of standard still costs.



SEND FOR THIS FREE BROCHURE

An 8 page analysis of *direct from steam* STERIL-AQUA, with special emphasis on the economic advantages of the STERIL-AQUA System.



OTHER NEW CES DEVELOPMENTS Castle Pfaudler DRYER BLENDER STERILIZER: First completely automatic unit for drying, blending and sterilizing bulk products. Send for free brochure. Castle STEROX-O-MATIC: First completely automatic gas sterilizing system developed for industry. Send for free brochure.

*CES MEANS CASTLE ENGINEERED STERILIZATION

A CONTINUING development and research program to create more efficient and economic sterilization. Castle engineers are prepared to offer practical solutions to any and all of your sterilizing problems.

Castle

FIRST IN INDUSTRIAL STERILIZATION

• DEPT. J. • ROCHESTER 2, N. Y.

THE CASTLE STERIL-AQUA®

DIRECT FROM BOILER STEAM
The new STERIL-AQUA system with a capacity range from 5 to 500 gallons per hour, is available for every need, from the smallest laboratory to the production line. Smaller units—5 (as shown), 12, and 25—are manually operated. Other units with manual, electric (remote), or full automatic controls. All STERIL-AQUA equipment is designed so the complete interior can be sterilized.

FOR YEARS OF PIPE ECONOMY...

**THIS
EXTRUDED
HEAVY
WALL**

PROTECTS
against severest heat,
pressure and corrosion

Proven in nuclear installations, CURMET high integrity tubing is ideal for the toughest applications in the petro-chemical, petroleum and chemical industries. This tubing from the Metals Processing Division of Curtiss-Wright is extruded in stainless steel and other ferrous alloys in lengths up to 45 feet or more. It provides increased on-the-job life, long term economy based on optimum physical properties—not just for months, but for years to come.

Curtiss-Wright tubing is extruded to specification by the 12,000 ton horizontal steel extrusion press. This process provides uniform high strength and high resistance to pressure, heat and corrosion. Write today for information on both your standard and special requirements.

Visit our booths 1344-46 at the Chemical Show, New York, Nov. 30-Dec. 4

**AVAILABLE FOR DELIVERY NOW
PREMIUM QUALITY STAINLESS
AND CHROME-MOLY TUBING**

- * 8" to 20" OD
- * Up to 45 ft. lengths
- * 1/4" through 4" walls

CURTISS-WRIGHT
CORPORATION 75 GRIDER STREET



METALS PROCESSING
DIVISION BUFFALO 15, NEW YORK

Check 1361 opposite last page.

Chemical Distributor

From page 25

It has been said that distributors price themselves out of the picture by demanding excessive discounts. Actually, a distributor sometimes must refuse to warehouse and sell items which do not turn a reasonable profit. There are a number of chemicals on which the price structure has been so abused by producers themselves that it is impossible for a distributor to handle them.

Some manufacturers have not used distributors because they believe their product might be devalued by indiscriminate price cutting. This is a "dusty fear." Distributors are keenly competitive, but they are as properly concerned with stable pricing and orderly marketing as are producers.

Despite attacks leveled against chemical distributors, their future appears bright. As the industry grows, so will they grow and prosper. By improving their skills, they will be able to distribute chemicals more economically and more efficiently. By demonstrating they are specialists—not middlemen—they will increase their customer ranks. And, finally, they will draw on past experience to find new and better ways to keep marketing costs at a minimum.

The chemical distributor fills a necessary economic function. He reduces the cost of sales and distribution for the producer, and at the same time reduces the many costs of buying for the manufacturing consumer. He will continue to grow as the many tangible and intangible benefits he offers to both seller and buyer become more evident.

Businessmen & Politics

From page 27

ment committees and commissions, whenever their experience and abilities can be useful. Many civic problems offer a challenge. Community management, safety, welfare, and many other activities must run smoothly if business is to

be conducted in an effective climate.

Through this kind of business leadership, others in industry will be encouraged to keep informed and participate. Thus, business will gain the position it now generally lacks of being an effective sounding board for guiding elected representatives on measures affecting business.

'Apathy of Public Aggravates Ills'

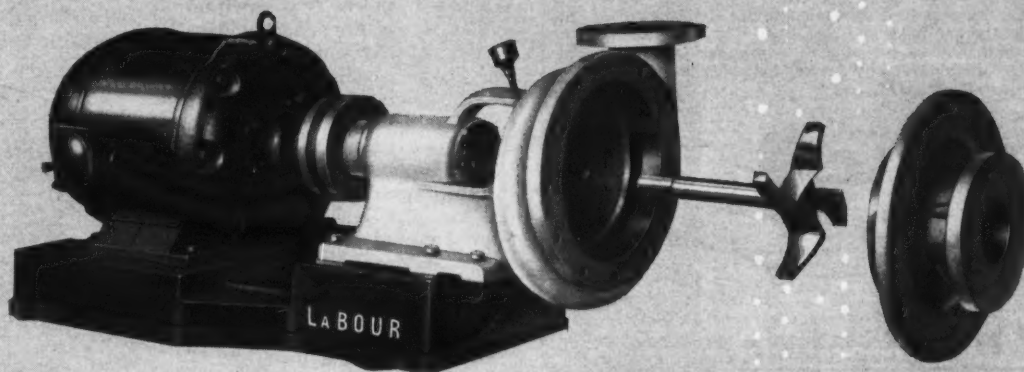
JOHN R. HOOVER, President, B. F. Goodrich Chemical Company, a division of the B. F. Goodrich Company—There has been a growing lethargy on the part of the average American concerning politics and the other activities that can be classified generally as "public affairs." He feels he is doing his civic duty when he contributes money or when he votes. Yet he often exercises his vote only when he has a strong feeling on a particular issue. He has little interest in the formation of political policy, and many do not participate in local government or the many organizations dedicated to community service.

Certainly there is need for better leadership and understanding in politics. Further, this need is not confined to the political arena alone. Community services, charitable and cultural groups, professional and educational organizations—all of these suffer from the apathy of the general public.

And this apathy often aggravates industrial ills. It is translated into misunderstandings and lack of cooperation from employees, their families and friends in times of crisis such as a strike or illegal work stoppage—and long-term problems such as recognizing the dangers of inflation or the pressure of competition.

While B. F. Goodrich corporate policy has for many years enthusiastically approved of employee participation in governmental and civic affairs and in politics, it has recently given more intensive study to

AIR or VAPOR —The Factors That Won't Stay Put



Calculating pump pressures and capacities is fairly simple as long as you deal with factors that behave themselves. But when *air* enters the picture you can trade your slide rule for a crystal ball.

Of course a pump isn't supposed to have any air in it, but nevertheless at unpredictable times you get air or vapor in unpredictable quantities. When you do, your nice calculation of volume and specific gravity and

viscosity goes out the window. All you can do is *guess*.

You can't escape the fact of air or vapor in what is supposed to be liquid, but you can play safe by specifying LaBour pumps. Even non-priming LaBours can handle air mixed with the liquid, and they do not air-bind in many situations which would make ordinary pumps inoperative. Ask us to give you all the interesting details.

ORIGINAL MANUFACTURERS OF THE SELF PRIMING CENTRIFUGAL PUMP

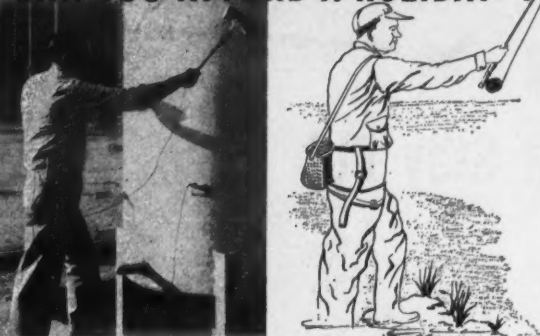
LABOUR

THE LABOUR COMPANY, INC. • ELKHART, INDIANA, U. S. A.



Check 1362 opposite last page.

CAN YOU AFFORD A HOLIDAY ?

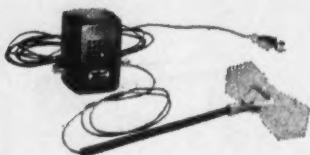


YES . . . on the money you save with TINKER & RASOR holiday detectors.

The M-1 is an approved inspection device that accurately and quickly locates pin-holes and bare spots. The M-1 is completely portable and may be used by any workmen on the job. The audible signal is powered by dry-cell batteries and makes a simple, positive indication of voids.

DISTRIBUTORS:

Crutcher-Rolls-Cummings Inc., Houston, Texas • Remco Manufacturing Co., Inc., Tulsa, Oklahoma • Canadian Equipment Sales & Service Ltd., Edmonton, Alberta, Canada • Bob Herrick, Rentals & Service, New Cumberland, Pennsylvania • Falcon Line Products Corp., Kearny, New Jersey • Export Agents: Frazer & Hansen Ltd., San Francisco, California



Electric Detectors for every Industry

TINKER & RASOR
417 Agostino Road, P. O. Box 281, San Gabriel, Calif.

Check 1363 opposite last page.

Positive bin level control—no overflows...no empties

with
STEPHENS-ADAMSON

"TELLEVEL" BIN-LEVEL CONTROLS



- Pendant float-ball or float-cone, operates sensitive switch to regulate level of bulk materials.
- Installed at various bin levels, the unit will start or stop flow of materials automatically.
- Will operate signal light or horn.

3 MODELS AVAILABLE

- Explosion-Proof
- Bin-Level
- Heavy Duty

WRITE FOR BULLETIN 11-0

**STANDARD PRODUCTS DIVISION
STEPHENS-ADAMSON MFG. CO.**
11 RIDGEWAY AVENUE • AURORA, ILLINOIS
PLANTS LOCATED IN: LOS ANGELES, CALIFORNIA
CLARKSDALE, MISSISSIPPI • BELLEVILLE, ONTARIO

Check 1364 opposite last page.

Businessmen & Politics

From preceding page

this question. As a result, the company has concluded that members of management in particular owe a duty as citizens to actively participate in politics through the party of their choice.

'Must Involve Himself As a Man in Politics'

ROBERT C. HOOD, President, Ansul Chemical Company—I believe it is essential that the businessman understand clearly the unique and, at times, confusing role he plays in society.

He stands squarely between the scientist and the politician. The scientist is a producer of knowledge. In the classical sense, the businessman is a producer of wealth—of goods and services. The politician's role is that of a redistributor of wealth.

Now let me clarify these statements. As a producer of knowledge, the scientist is basically amoral. Society does not expect him to be concerned with the implications of his discoveries—in fact, society rather resents the scientist who is concerned.

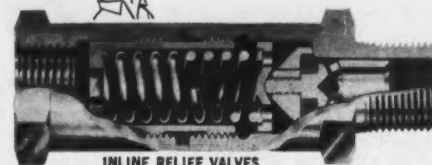
At the other pole, the politician is essentially moral. He is expected by society to be concerned with people and the effect of scientific discoveries on people. The businessman is a transfer agent. Amorally, he takes scientific knowledge and transfers it into goods and services. At the same time he is doing this, however, he must keep in mind the moral implications—the effect of his actions on society. Therefore, he is both moral and amoral.

The conflict and confusion comes in society's attitude toward the businessman-transfer agent. It is never certain whether he is operating morally or amorally and hence his involvement, or suspected involvement, in either science or politics is both resented and restricted.

I believe that as a citizen and as a man, the businessman must be concerned with politics. But he must involve himself as a man and not as a



**ALMOST ACCURATE
IS NOT GOOD ENOUGH**



INLINE RELIEF VALVES

CIRCLE SEAL RELIEF VALVES...

provide the **ACCURACY** and **RELIABILITY** required for critical applications. These valves can be installed in virtually any liquid or gas system. An "O" ring seal provides dead tight sealing. Each valve is precision-designed for minimum flow restriction. Other significant advantages include ease of installation, tamper-proof setting, and in-line construction.

5100 Series—10 to 2400 psi.

500 Series—0.5 to 140 psi.



CHECK VALVES



SHUTOFF VALVES



PLUG VALVES



POPOFF
RELIEF VALVES

Complete engineering data available. Write today!



precision valves

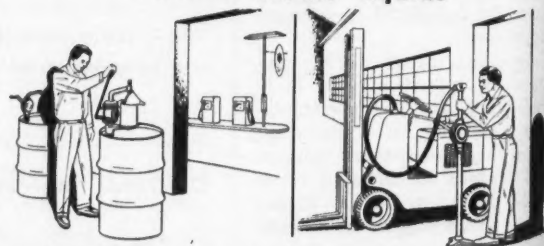
Circle Seal Products Co., Inc.
2181 East Foothill Blvd., Pasadena, Calif.

Check 1365 opposite last page.



Handy Pump says:

**"For transferring, for dispensing
hard-to-handle liquids"**



BLACKMER Hand Pumps are hard to beat!

Write for Bulletins 310 and 320

"liquid materials handling" equipment



BLACKMER

BLACKMER PUMP COMPANY, GRAND RAPIDS 9, MICH.

See Yellow pages for your local sales representative

Check 1366 opposite last page.

CHEMICAL PROCESSING

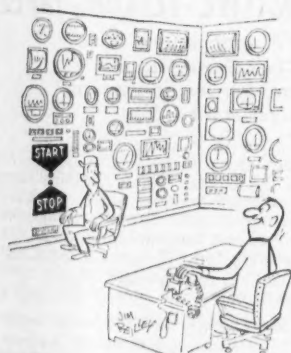
businessman. To do this effectively he must understand his position in society and he must be aware of the manner in which society looks at him.

'... Play Important Role in Public Affairs'

E. R. BAKER, General Manager, Continental Oil Company's Petrochemical Department—It appears to me that the question "Should businessmen go into politics?" almost answers itself. Businessmen everywhere find their affairs are increasingly entangled in a complex maze of government regulations and other activities. A better question seems to be, "Can the businessman afford not to do something about this situation?"

Businessmen as citizens are, of course, interested and active in politics in government. Such participation by all individuals is essential in our system of representative government. The point of view and aims of each of us will reflect our interests which in turn are dependent on our various relationships in society.

Managers of (business) organizations as individual free citizens can and should play a very important role in public affairs in general. There is no other way for businessmen to have a voice in shaping policies of our country.



"Clemente won't be in today. He sprained his finger!"

OCTOBER 1959



Gaulin Homogenizers PAY EXTRA DIVIDENDS

in Improved Particle Control ... Lower Ingredient Costs



Some Typical Applications of GTA

- Wax emulsions
- Resin emulsions
- Pigment dispersion
- Adhesives
- Fat emulsions
- Experimental coating colors
- Chemical reactions
- Pharmaceuticals
- Dope dying
- Light ink dispersions
- Leather finish
- Carbon black dispersion
- Vinyl-pigment dispersions
- Grease and petroleum production
- Suspensions
- Cosmetic and hand cream blending
- Soap processing
- Latex compounding

There are many good reasons for using Gaulin Particle Control in blending, dispersing or emulsifying your products. First, it improves texture, makes finer more uniformly stable emulsions. Second, it accents color. Third, it stops separation.

Why not investigate Gaulin Homogenizers, Sub-Micron Dispersers or Colloid Mills for your products? Send for Technical Bulletins H-55, LH-55, SMD-55 and C-57. Ask for Gaulin GTA . . . Gaulin Technical Assistance, too. Or if you prefer to try Particle Control in your plant, rent a Gaulin Laboratory Homogenizer or Colloid Mill for only \$75.00 per month.



World's largest manufacturer of stainless steel reciprocating, rotary, pressure exchange pumps, dispersers, homogenizers and colloid mills



55 Garden Street,

Everett 49, Mass.

Ask GTA...

Gaulin Technical Assistance — for data on the complete Gaulin line: Homogenizers, Colloid Mills, Submicron Disperser, Triplex High Pressure Pumps and HX Pumps. Get GTA from your nearest Manton-Gaulin Representative . . .

Akron 8, Ohio
White Industrial Sales and Equipment Company
919 Second National Bldg.
Birmingham 6, Alabama
D. B. Gooch Associates, Inc.
5018 First Avenue, North
Boston, Mass.
Joseph H. Bertram & Company, Inc.
570 Hillside Avenue
Needham Heights 94, Mass.
Buffalo 6, N. Y.
A. W. Johnston Co.
2021 Clinton St.
Calgary, Alberta
Harvey Carruthers, Limited
122 17th Avenue, S.E.
Charleston 1, West Va.
White Industrial Sales and Equipment Company
1033 Quarrier Bldg.
Chicago 6, Ill.
Fuente and Webster Inc.
349 West Randolph St.
Cincinnati 2, Ohio
White Industrial Sales and Equipment Company
140 West Sixth St.
Cleaverwater, Pa.
Johnson Roney II and Associates
P. O. Box 26
Cleveland 15, Ohio
White Industrial Sales and Equipment Company
227 Hanna Bldg.
Detroit 36, Mich.
H. A. Reed Company
19465 James Couzens Highway
Denver 18, Colorado
Aldredge & McCabe
847 East 17th Ave.
Houston 2, Texas
Edward Soph Company
768A M & M Bldg.
Indianapolis, Indiana
Avela Sales & Engineering Co.
1407 E. Riverside Dr.
Los Angeles 39, Calif.
E. M. Underwood and Company
2901 Rowena Avenue
Minneapolis 3, Minn.
George R. Mellema Co.
620 Plymouth Bldg.
Montreal 9, P. Q.
Richardson Agencies Ltd.
640 Laurier Ave. E., Suite 4
Postal Address: P. O. Box 2, Station O,
Montreal 9, P. Q.
Newark, New Jersey
Frederick E. Harstein & Associates
Benninger Building
1429 Route 22
Mountainside, N. J.
New York City 24, N. Y.
Kenneth S. Valentine Inc.
111 West 83rd St.
Oakland 11, California
E. M. Underwood and Company
4385 Piedmont Ave.
Philadelphia, Pennsylvania
R. W. Fox Company
P. O. Box 196
Newtown Square, Pa.
Pittsburgh 22, Pa.
White Ind. Sales and Equipment Co.
612 Farmers Bank Bldg.
Portland 14, Oregon
The Burhan-Sharpe Co.
Weatherly Building
St. Louis 8, Missouri
Wharton L. Peters Machinery Company
3863 West Pine Blvd.
Seattle 4, Washington
The Burhan-Sharpe Co.
1731 First Avenue, S.
Toronto, Ontario
Richardson Agencies Ltd.
164 Bentworth Ave.
Postal Address: P. O. Box 8, Station T,
Toronto 19, Ontario
Tulsa, Oklahoma
Edward Soph Company
202 East 18th St.
Vancouver 10, B. C.
Harvey Carruthers, Limited
9 East Broadway
West Hartford 7, Conn.
Joseph H. Bertram & Company, Inc.
998 Farmington Avenue

Check 1367 opposite last page.

More clean water at a lower cost with...

S.P. KINNEY **AUTOMATIC**
SELF-CLEANING

STRAINERS

... for efficient removal and disposal of suspended particles from raw or process water and other liquids

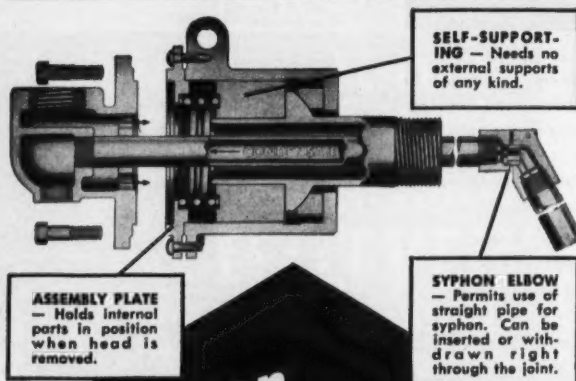


- ✓ Over 1000 installations
- ✓ 2" to 48" pipeline sizes
- ✓ Installation on pressure or suction side of pump
- ✓ Over 8 billion gallons per day installed capacity
- ✓ Large variety of straining media

Write today for Bulletin 500.1
and list of installations

S.P. KINNEY ENGINEERS, Inc.
CARNEGIE, PENNSYLVANIA

Check 1368 opposite last page.



ASSEMBLY PLATE
— Holds internal parts in position when head is removed.

SELF-SUPPORTING
— Needs no external supports of any kind.

SYPHON ELBOW
— Permits use of straight pipe for syphon. Can be inserted or withdrawn right through the joint.

Johnson
Rotary Joint
with SYPHON ELBOW

Johnson Joints represent the best way industry has yet found to get steam or liquids into rotating rolls and cylinders. They are completely packless, need no lubrication or adjustment. The Type SBP shown gets steam in, condensate out, through the same head. Other types available for through flow service, in sizes to meet all operating needs.

WRITE FOR COMPLETE INFORMATION.

The Johnson Corporation

826 Wood St., Three Rivers, Mich.

Check 1369 opposite last page.

Euro-Report

From page 30

duce high yields of acetylene and ethylene from both gaseous and liquid feed stocks. A semi-commercial unit has been in operation two years.

A 100-million-lb unit now is being built to produce acetylene and ethylene from light virgin naphtha.

A new process has been developed and a pilot plant built by Knapsack-Griesheim to manufacture acrylonitrile via lactonitrile. Pilot plant operations seem to show a 10 percent better yield and a 34 percent total reduction in cost of starting materials.

Etablissements Kuhlmann, French chemical manufacturer, has developed a process for producing nitric acid via ammonia oxidation.

Chemische Werke Huls reported it has increased use of air cooling in favor of conventional cooling towers. Water shortages in some parts of Western Europe dictate use of air cooling equipment. Air cooling there is in its early stages, just as it is in America.

A rather interesting plan for conservation of electricity has been worked out at Chemische Werke Huls. During periods of high electric cost, calcium carbide furnaces are operated at low capacity during the day and as much as possible of the 300,000 kw generated is sold to the power company at the high rate.

During off-peak hours, additional power is purchased at low rates so the carbide furnaces may be operated at high capacities. During periods of high acetylene production, gas is stored in tanks to provide adequate supplies for the following day's requirements.

Scientific research conducted at Mellon Institute during last year is documented in 40-page annual report. Book may be obtained by writing to Mellon Institute, 4400 Fifth Avenue, Pittsburgh 13, Pa.

Process engineering services are described and examples cited in 24-page Bul 0-59-1—Foster Wheeler Corporation, 666 Fifth Ave., New York 19, N.Y.

Check 1370 opposite last page.

NEW...

from *Manzel*

FLOW-actuated alarm

LUBE-LINE ALERT gives positive protection to valuable compressors, engines, machinery and other equipment using force feed lubrication. Small, compact precision-made FLOW alarm inserts into oil lines near each terminal point.

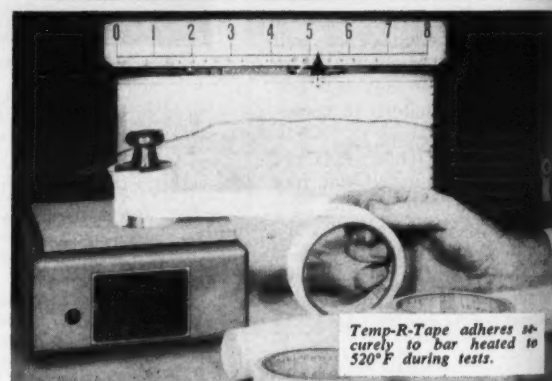
- Fits any make of lubricator
- Connects electrically to any signal—horn, buzzer, light, whistle, telephone, relay
- Signals LACK OF FLOW through line
- Flow capacities from 1/2 cc to 2 qts/min.
- Handles any viscosity oil or synthetic
- Pressures to 10,000 psi in standard models
- Explosion-proof units available

FREE Specification Sheet gives complete details. Write for your copy.

274 Babcock Street
Buffalo 10, N. Y.

Manzel
Always FIRST with the BEST in lubrication

Check 1371 opposite last page.



Temp-R-Tape adheres securely to bar heated to 520°F during tests.

CHR PRESSURE-SENSITIVE TEFLON® TAPES

- —100°F to 500°F applications
- Class H and Class C insulation
- Non-stick and low friction facing
- Chemical resistant facing
- Easy to apply

Temp-R-Tape is available from stock in rolls and sheets. All four types — Temp-R-Tape T; TH; C and TGV — combine some form of Teflon backing with silicone polymer adhesive to provide easy-to-apply pressure-sensitive and thermal curing pressure-sensitive tapes for electrical and mechanical applications. Designed for extreme temperatures, Temp-R-Tapes possess high dielectric strength, low power factor, high elongation, negligible moisture absorption, are non-corrosive and non-contaminating.

FREE SAMPLES and folder — write, phone or use inquiry service.

CHR **CONNECTICUT HARD RUBBER**
*duPont TM

Main Office: New Haven 9, Connecticut

Check 1372 opposite last page.

CHEMICAL PROCESSING

THAT'S INTERESTING

Plastic bottles, tubes boom

Record number of 440,811,000 plastic bottles and tubes were made last year, reports the Plastic Bottle and Tube Manufacturers' Institute. This was an 8 percent increase over old mark set in 1957.

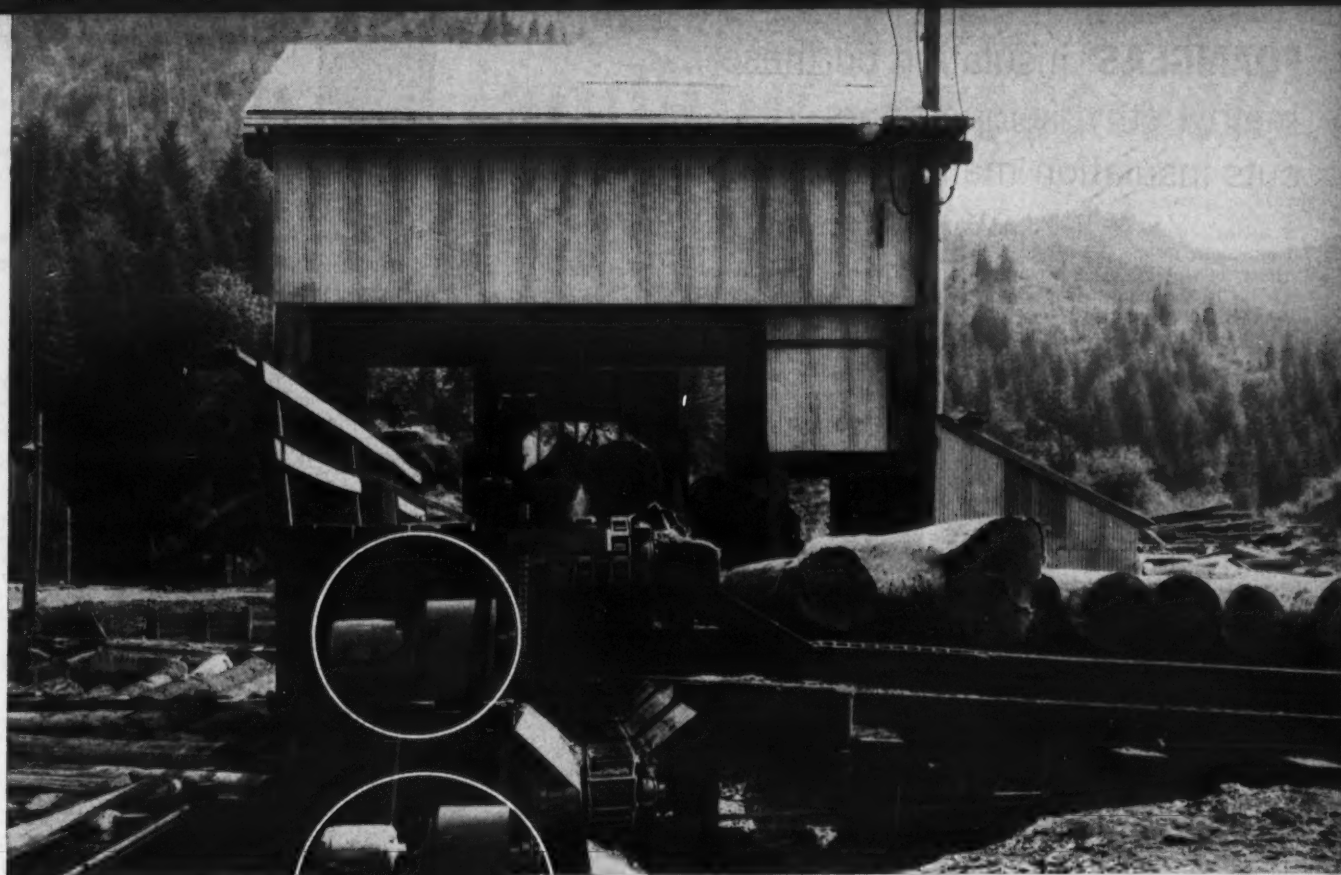
Sleeping fish

At night time, a fish native to Bermuda scoops out a "bed" in the sand and doesn't kick off the "covers" until daylight. At least that's what the Oak Ridge National Laboratory News reports.

Flash units get smaller

An electronic flash unit has been designed which is no larger than a postcard and weighs about 2 lb. It can be carried easily in jacket pocket. Manufacturer says both quality and efficiency are equal to units of larger size.

For more information on product at right, specify 1373 see information request blank opposite last page.



FALK Motoreducers driving log conveyor and refuse conveyor at the modern mill of The Bohemia Lumber Company, Culp Creek, Oregon.

FALK all-steel Motoreducers give you longer service life

Whether your load conditions are normal or heavy, the extra rigidity of all-steel construction (more than twice that of cast iron) maintains better alignment of revolving elements under load...a vital factor in prolonging the service life of gears and bearings.

And if your installations are subject to shock loads, or accidental external impacts, you're way ahead when you install Falk All-Steel Motoreducers. These rugged units do not destroy themselves by tearing off their feet under jamming overloads, nor are their housings subject to cracks which both dissipate the vital lubricant supply and allow revolving elements to get out of alignment.

All-steel construction is one of the built-in extras that you get in Falk Motoreducers. Others include: (1) 12 to 15% reserve load-carrying capacity in the gears (by AGMA standards), thanks to exclusive Falk extra-depth, high pressure angle helical gears; (2) maximum mechanical efficiency (98½% per gear mesh, under full load); (3) your choice of standard units (horizontal, vertical or right angle) to fit your precise requirements.

HORSEPOWER RANGE: to 75 hp ... **STANDARD OUTPUT SPEEDS:** 780 rpm (high) to 1.2 rpm (low).

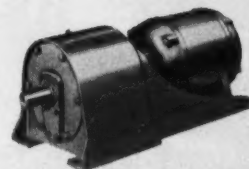
Prompt delivery from: distributor stocks, or from warehouse or factory. Ask your Falk Representative or Authorized Falk Distributor for **Bulletin 3100**.

THE FALK CORPORATION, MILWAUKEE 1, WIS.

MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS

Representatives and Distributors in most principal cities

Take your choice of all-steel drives when you specify Falk



**THE FALK ALL-MOTOR
MOTOREDUCER**
...the original All-Motor unit



**THE ALL-STEEL FALK
SHAFT MOUNTED DRIVE**

Torque ratings to 41,000 lb-in at low speed shaft. Also available in flange-mount design.

FALK

... a good name
in industry

FALK and ALL-MOTOR are
Registered Trademarks.

FOAMGLAS® insulation on these methyl ethyl ketone filters cuts insulation maintenance costs

A saving in ketone filter insulation maintenance at the Beaumont, Texas, refinery of Mobil Oil Company is made possible by the many extra benefits of FOAMGLAS insulation.

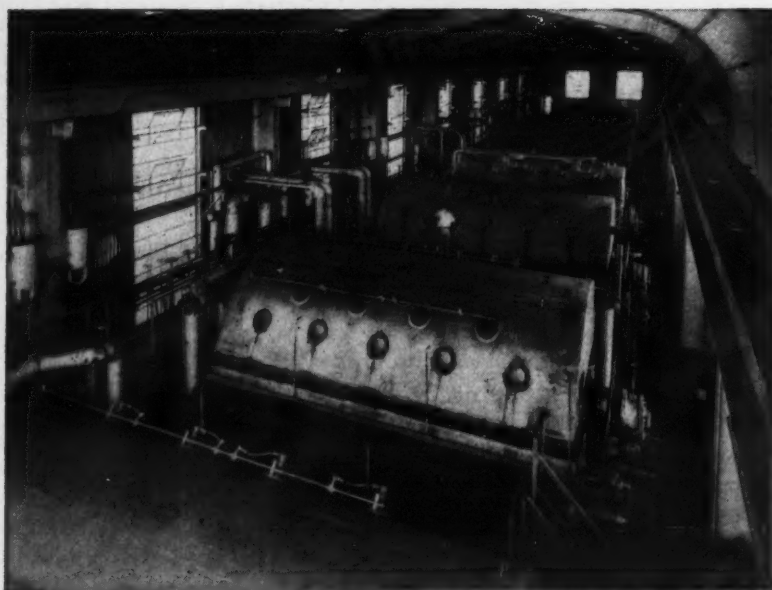
Different operating temperatures for different jobs subject this insulation to constant strain. Filters are chilled anywhere from 40°F. to 0°F., often resulting in ice formation from condensed water vapor. This has damaged insulation materials previously used at the refinery. But water vapor cannot penetrate the sealed glass cells of FOAMGLAS. There's no crushing "freeze-thaw" cycle within the FOAMGLAS as there is with organic insulations.

Insulation loses much of its effectiveness when it becomes waterlogged. Not FOAMGLAS, however. Other insulations tried had required frequent maintenance, while FOAMGLAS remains effective for the six years it has been in use. Extremely easy to work with, easy to cut and shape with any sharp tool, FOAMGLAS is impervious to acid . . . or ketone.

Why not find out more about FOAMGLAS insulation? Write for a sample and for information on our two newest products; FOAMGLAS Stay-Dry Pipe

Insulation, and new 1¾" FOAMGLAS Roof Insulation. Pittsburgh Corning Corporation, Department CP-109, One Gateway Center, Pittsburgh 22, Pennsylvania. In Canada: 3333 Cavendish Boulevard, Montreal, Quebec.

Pittsburgh Corning offers a complete line of mastics, tank coatings and other accessory materials specifically designed for use with FOAMGLAS.



The three filters shown above are typical of filters insulated with FOAMGLAS. These 21' by 11' diameter filters, insulated with layers of 2" and 3" FOAMGLAS, separate wax from oil. The refinery, largest in the Mobil system, has a rated capacity of 220,000 barrels per day.

PITTSBURGH **pc** CORNING

Check 1374 opposite last page.



new literature

Reviews of publications pertinent to the industry. Additional reviews are found throughout other sections of this magazine

Sulfur recovery from hydrogen sulfide and simultaneous alleviation of air-pollution problems are discussed in four-page booklet, "Sulfur Recovery" — Girdler Construction Division, Chemetron Corporation, Box 174, Louisville 1, Kentucky.

Check 1375 opposite last page.

Polyethylene chemical pump, for dispensing from drums and carboys, is depicted in Tech Develop. Information 1519—U.S. Industrial Chemicals Co., Division of National Distillers and Chemical Corporation, 99 Park Ave., New York 16, N.Y.

Check 1376 opposite last page.

Metal acetylacetonates' physical properties and potential uses are summed up in four-page folder. Literature references are included. Bul 69-0163—New Product Engineering Group, Union Carbide Metals Company, Div. of Union Carbide Corporation, P. O. Box 330, Niagara Falls, N. Y.

Check 1377 opposite last page.

Thermistor probes are explained and technical characteristics given in six-page Thermistemp Bul—Yellow Springs Instrument Co., Inc., Yellow Springs, Ohio.

Check 1378 opposite last page.

Teflon-lead dry bushings and thrust washers are discussed in the light of latest information in Bul DU-458A—The United States Gasket Company, plastics division of The Garlock Packing Company, Camden 1, N.J.

Check 1379 opposite last page.

Low-lift walkie truck for pallets gets coverage in four-page brochure. Specifications are complete for 4000- and 6000-lb-capacity models in PAL-SC Brochure—The Moto-Truc Company, 1900 E. 59th St., Cleveland 3, Ohio.

Check 1380 opposite last page.

Adhesive testers for checking suitability of adhesive to adherent are described in Bul 1051-TA—Thwing-Albert Instrument Company, Penn St. and Pulaski Ave., Philadelphia 44, Pa.

Check 1381 opposite last page.

Laboratoryware of Teflon is subject of four-page Chemware Brochure — Chemplast Inc., 3 Central Ave., E. Newark, N. J.

Check 1382 opposite last page.

Heat-transfer-cement properties and uses are treated in 22-page booklet which includes tables, formulas, and charts. Engineering Data Book 502—Thermon Manufacturing Company, Box 1961, Houston, Texas.

Check 1383 opposite last page.

Flooring materials which are corrosion-proof and which can be installed on concrete slab are completely discussed and illustrated in Bul 3-4—Atlas Mineral Products Company, Mertztown, Pa.

Check 1384 opposite last page.

Clay and activated bauxite products are topic of four-page brochure, emphasizing properties and applications, particularly for petroleum industry. Technical Information 402—Minerals & Chemicals Corporation of America, Menlo Park, N.J.

Check 1385 opposite last page.

Water-knife selection, specifications, and application information is contained in Bul 5983—Chain Belt Company, 4644 W. Greenfield Ave., Milwaukee 1, Wis.

Check 1386 opposite last page.

Sight glass and mounting which has double safety factor of 10-plus is presented in Sight Glass and Mounting Folder—Pressure Products Co., Inc., Dept. 12, Box 424, Charleston, W. Va.

Check 1387 opposite last page.

Metal lumber—Enamelized-steel construction angle, slotted for easy erection, is subject of 18-page catalog. Steps in planning job, calculating load, cutting and joining to produce storage racks, tables, scaffolding, and other items are clearly explained. Photographs and drawings show typical applications. Four pages of load tables aid calculations. Cat ES-2058R—Berger Division, Republic Steel Corporation, 1038 Belden Ave. N.E., Canton 5, Ohio.

Check 1388 opposite last page.

Nuclear density gages, their method of operation and performance advantages, are covered in Bul SG — The Ohmart Corporation, 2236 Bogen St., Cincinnati 22, Ohio.

Check 1389 opposite last page.

Isobutyl alcohol's use as a solvent and chemical intermediate is explained in eight-page booklet. Tables and graphs show compound's effect on solution viscosity of polymeric materials and retarding effect on evaporation rates of medium-boiling ester solvents. Bul B-104 — Eastman Chemical Products, Inc., subsidiary of Eastman Kodak Company, Kingsport, Tennessee.

Check 1390 opposite last page.

Cyclized rubber in protective coatings is considered in brochure concerned with its use in formulation of chemical-resistant coatings. Alplex Brochure—Alkydol Laboratories, Inc., Division of Reichhold Chemicals Incorporated, 3242 S. 50th Ave., Cicero 50, Ill.

Check 1391 opposite last page.

Tritium tracer-application advances are reviewed in 67-page bulletin which consists of proceedings of symposium on advances in tracer applications on tritium. Tritium Tracer Applications Bul — New England Nuclear Corp., 575 Albany St., Boston 18, Mass.

Check 1392 opposite last page.

Air-equipment applications, covering ideas on use of air motors, compressors, and vacuum pumps, are contained in 12-page Bul APP-17 — Gast Manufacturing Corp., Box 117, Benton Harbor, Mich.

Check 1393 opposite last page.

Urea-formaldehyde resin is specified in Resin 301 Spec. Sheets—Catalin Corporation of America, One Park Ave., New York 16, New York.

Check 1394 opposite last page.

Octylene oxide's reaction with epoxy curing agents is subject of six-page technical information sheet. Effect on viscosity of bisphenol A-derived epoxy resin is illustrated. Tech Information Sheet 71 — Chemicals & Plastics Division, Food Machinery and Chemical Corporation, 161 East 42nd St., New York 17, N.Y.

Check 1395 opposite last page.

Liquid-level control, utilizing magnetic operating principle, is included in Liquid-level Control Cat — Magnetrol, Inc., 212 S. Marshall Blvd., Chicago 23, Ill.

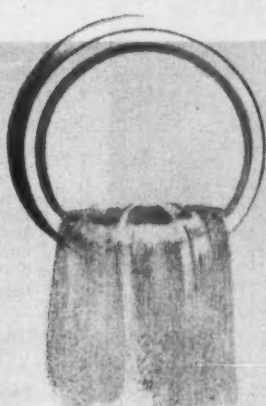
Check 1396 opposite last page.

Waste Handling...Presolved!



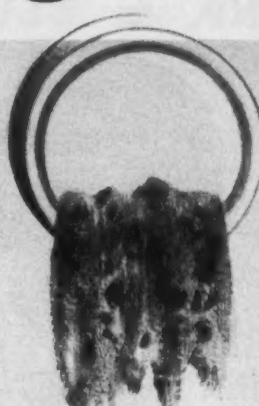
Gases and Vapors

Waste and toxic gases • vapor recovery and recondensation • vacuum distillation • gas blowing • low vacuum • refrigerants



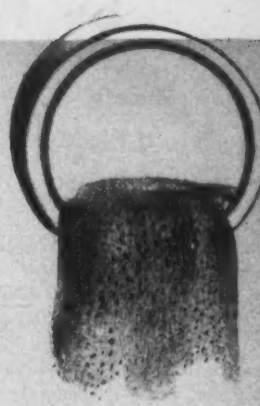
Clear Liquids

Surface drainage • tank car unloading • process wastes • viscous liquids • acids: sulphuric, hydrochloric, acetic • spent caustic brine • cyanides • tank farm drainage



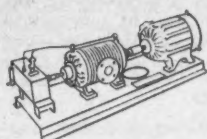
Slurries

Liquids with ashes, fly ash, cinders, coal particles, catalysts, coke, sand, glass • tar • paint • pigments • adhesives • abrasives • molten sulphur • cane juice • black liquor

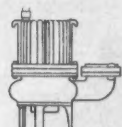


Solids and Semi-solids

Heavy, bulky, dry materials • acid slurries • sand • ashes • powdered coal • cracking catalysts • sludges • pulp



Air Cooled Units



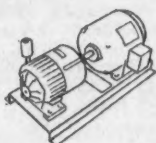
Submersible Pumps



Series 8000



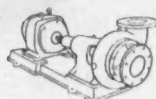
Transporter



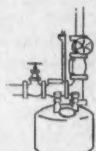
Fan Cooled Units



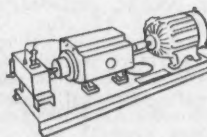
Series 3000



Series 6000



Expelsor®



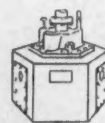
Water Cooled Units



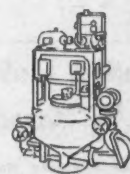
Unique Designs



Shone® Ejectors



Pneu-Pumps



Package Shone®

Right now you may be puzzling over a particular waste handling job—which type of pump to use and whether pneumatic or electric; corrosion problems; reclaimable materials; precautions for hazardous wastes; and a dozen other considerations. Handling wastes is tricky, takes a know-how all its own.

For 61 years, Yeomans has been solving waste and drainage problems throughout industry. Once in a while, Yeomans engineers bump into a new twist, but usually the job is one that has been worked out time and again.

Chances are, your own problem is already solved. Why not contact your Yeomans engineer-representative and find out. He brings you a wealth of experience, plus types of equipment unique in the field. If you don't already know him, look in Sweet's Catalog or in the yellow pages of the telephone book under "Pumps."



Pumps and Waste Treatment Equipment

2003-5 N. Ruby St., Melrose Park, Illinois

P-5924

Check 1397 opposite last page.

Stainless Steel Fabrication by KIRK & BLUM

**Sheets,
Light Plate
and Structural**

With over 50 years of experience in the field, KIRK & BLUM offers economical fabrication to the most exacting specifications.

Stainless fabrication is quite different from conventional steel working. KIRK & BLUM engineers and workers have the special knowledge and techniques to do an outstanding job. In all-important welding, for example, selection of the best process . . . metallic arc or inert gas arc welding, seam or spot welding; prevention of distortion and warpage; prevention or removal of discoloration; prevention of disturbance of chemical and physical properties which might lead to corrosion . . . all contribute to a first quality fabrication job.

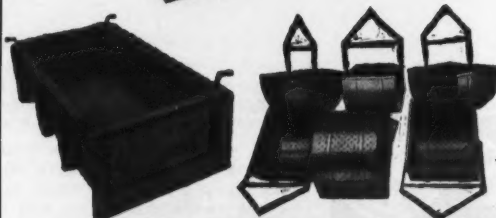
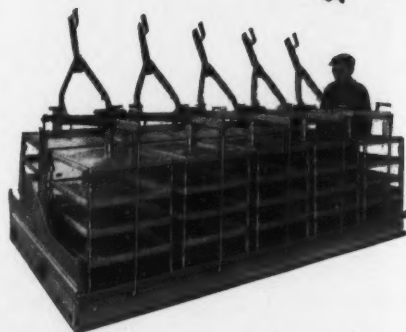
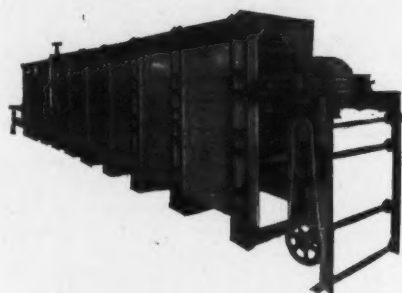
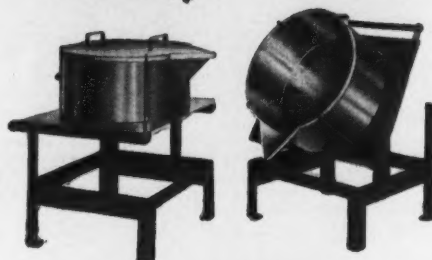
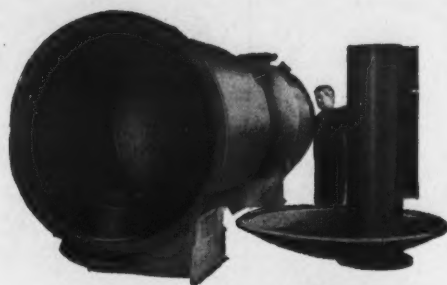
Whatever your requirements, KIRK & BLUM facilities are at your service. For prompt quotation, send prints and details to: The Kirk & Blum Mfg. Co., 3133 Forrer St., Cincinnati 9, Ohio.

Complete Facilities to 1/2" Capacity

- Square & Rotary Shearing
- Braking, Forming & Rolling
- Punching, Riveting & Drilling
- Arc, Spot & Seam Welding
- Inert Gas & Submerged Arc Welding
- Grinding and Finishing

Literature on Request:
"SHEET and PLATE FABRICATION"
"ELECTRICAL ENCLOSURES"

THE
KIRK AND BLUM
MANUFACTURING CO.
3133 Forrer St.
Cincinnati 9, Ohio



KIRK & BLUM

Check 1398 opposite last page.

NEW LITERATURE

Centrifugals, including a super-suspended model which can achieve 1600 rpm (1750 G's), are treated in Centrifugal Literature—Centrifugal Division, The New Fletcher Works, Inc., 201 Glenwood Ave., Philadelphia 40, Pa.

Check 1399 opposite last page.

Uranium scrap recovery plant is described in brochure which also discusses wide range of products and specialized services related to nuclear industry. "Products For Nucleonics"—Engelhard Industries, Inc., 113 Astor St., Newark 2, New Jersey.

Check 1400 opposite last page.

Inert-atmosphere generators—their applications and features—are detailed and utilities table given in four-page Bul I-459—Gas Atmospheres, Inc., 20011 W. Lake Rd., Cleveland 16, Ohio.

Check 1401 opposite last page.

Plastic pumps, available in variety of materials and having capacity range of 1/3 to 40 gpm, are detailed in Plastic Pump Cat—Vanton Pump & Equipment Corp., Division of Cooper Alloy Corp., Hillside, N.J.

Check 1402 opposite last page.

Water-treating equipment is covered in 24-page bulletin, which summarizes information on softeners, demineralizers, de-alkalizers, ion exchangers, filters, and aerators, among others. Bul 615—Elgin Softener Corporation, 134 N. Grove Ave., Elgin, Ill.

Check 1403 opposite last page.

Alkyl and alkylene amines—their properties and uses—are described in 52-page booklet. Included is comprehensive data for 19 amines, as well as detailed bibliography and reference section. Bul F-40267—Union Carbide Chemicals Company, Div. of Union Carbide Corporation, 30 East 42nd St., New York 17, N.Y.

Check 1404 opposite last page.

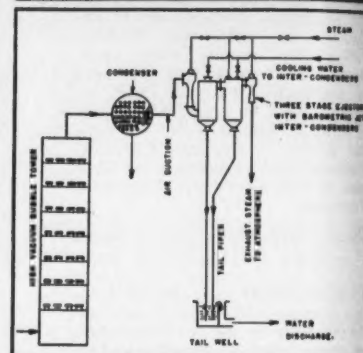
Process equipment field installations are depicted in four-page Field Installations Bul—Solar Chicago, Division of U. S. Industries, Inc., 6400 W. 66th St., Chicago 38, Ill.

Check 1405 opposite last page.

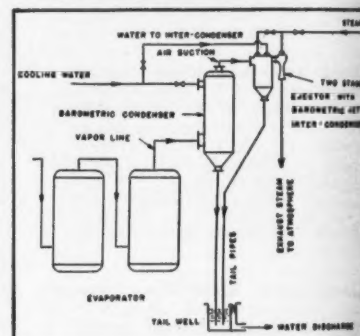
Tractors and trucks that travel without an operator are discussed in four-page bulletin. Typical applications are listed and pictured for this electronically guided material-handling system. Bul 586—Barrett-Cravens Company, 630 Dundee Rd., Northbrook, Ill.

Check 1406 opposite last page.

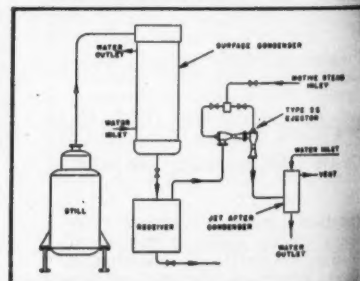
Here's how to get
high vacuum
at lower cost... from
C. H. WHEELER



In Refining Operation—3-stage C.H. Wheeler Tubejet Air Ejector draws off exceptionally large volumes of gases and vapors; produces high vacuum in bubble tower. Cost is low because Tubejets, with no moving parts, seldom need maintenance.



In Evaporation, Tubejet Ejector works with Wheeler Barometric Condenser to produce high vacuum. Initial cost of Ejector is low and installation is easy because of light weight and simple connections.



In Distilling—2-stage, non-condensing Tubejet produces high vacuum in the still. Note Wheeler Surface Condenser and Jet After-Condenser, too. Tubejets operate simply; have stainless steel, bronze and cast iron corrosion-resistant materials. Result: many Tubejets still operating after 35 years service!

FREE! 35-page catalog showing and describing many other ways to improve your vacuum operations and save money. Ask for Catalog 1402.

Process Equipment Division

C. H. WHEELER MFG. CO.

19th and Lehigh Avenue • Philadelphia 32, Pa.
Steam Jet Vacuum Equipment • Centrifugal, Axial and Mixed Flow Pumps
Steam Condensers • Marine Auxiliary Machinery • Nuclear Products

Check 1407 opposite last page.

CHEMICAL PROCESSING

NEW LITERATURE

Thickeners, hydros separators, air-lift agitators, reactor-thickeners and slurry mixers are covered in eight-page **Thickener Bul—Process Engineers, Inc., Division of The Eimco Corporation, 420 Peninsular Ave., San Mateo, Calif.**

Check 1408 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Lift-truck control system which is simplified for faster maneuvering and higher efficiency is explained in four-page brochure. Right-foot pedal combines forward-reverse shifting with engine throttle; two dashboard pushbuttons govern parking brake and transmission engagement. Precise control of truck movement is obtained by left-foot inching-brake pedal. Monotrol Brochure—Hyster Company, 1003 Myers St., Danville, Illinois.

Check 1409 opposite last page.

Liquid-Liquid Extraction

Both theory and applications of liquid-liquid extraction are covered in this 209-page volume. Written by Lucas Alders, Research Chemist, Koninklijke Shell, Amsterdam (The Netherlands), the book discusses pros and cons of various extraction processes. Formulas are derived and their use explained.

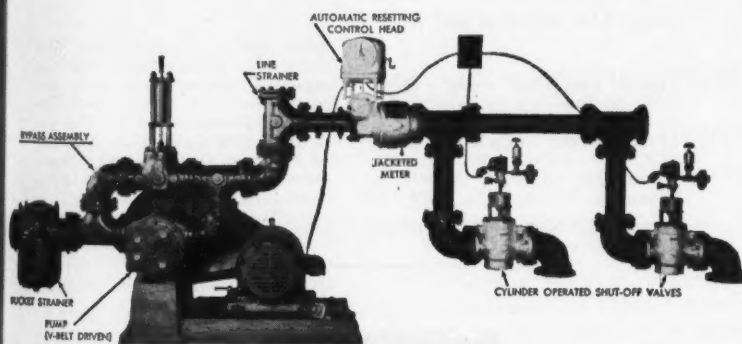
To obtain "Liquid-Liquid Extraction" remit \$8.50 direct to D. Van Nostrand Company, Inc., 120 Alexander Street, Princeton, N. J. Check 1410 opposite last page.

Dry mixer for research, pilot plant, small-lot production, is reviewed in **Mina-Mixer Bul—Munson Mill Machinery Co., 200 Seward Ave., Utica, N. Y.**

Check 1411 opposite last page.

Filter aid, made from special form of carbon processed to give it filtering qualities, is featured in 12-page **Nerofil Bul—Nero-Products Department, Great Lakes Carbon Corporation, 333 N. Michigan Ave., Chicago 1, Ill.**

Check 1412 opposite last page.



TYPICAL MULTI-VALVE FLUIDOMETER SYSTEM for a more flexible production schedule

ANYTHING

that can be handled through a meter can be accurately and economically batched by the

FLUIDOMETER

Multi-valve Fluidometer systems make possible a more flexible production schedule by varying the size of the batches, or by using the automatic resetting control to deliver the same quantity time after time. A multi-valve Fluidometer system may be controlled either at the point of use or at the Fluidometer control head. Fluidometer installations are available either jacketed or un-jacketed and are "tailor made" to fit the particular job. Tell us your batching problem and let us give you our suggestions for solving it.

Bulletin FI-56 will be sent on request. For information on jacketed pipe and fittings write for Bulletin J-56.

HETHERINGTON & BERNER INC. • ENGINEERS-MANUFACTURERS
710 KENTUCKY AVENUE INDIANAPOLIS 7, INDIANA

Check 1413 opposite last page.

OCTOBER 1959

NOW greater economy

LENAPE A.S.A. FLANGE *Plus*



For many pressure vessel requirements, progressive designers are specifying economical Lenape flanges and seamless weld end extensions in place of more costly long welding necks in I.D. sizes from 16" to 24".

Check these distinct advantages:

LENAPE FLANGES OFFER:

- Full I.D. opening for easier access and replacement of vessel internals.
- Wall thickness equivalent to more expensive Seamless Welding Necks.
- Special facings in solid material.
- Positive flange cost economy.

LENAPE SEAMLESS EXTENSIONS OFFER:

- Full I.D. opening free from constrictions imposed by pipe.
- Heavier walls than either pipe or rolled plate—greater corrosion and pressure resistance.
- No axial seam to be radiographed.
- Inherent reinforcement.

IN COMBINATION:

- Economy in lengths beyond 12" overall as compared to Seamless Welding Necks.
- Joining weld is X-rayable, in contrast to a slip-on flange.
- Extension may first be welded to vessel, then flange welded to extension without refacing the flange.

Write today for detailed specifications.

LENAPE

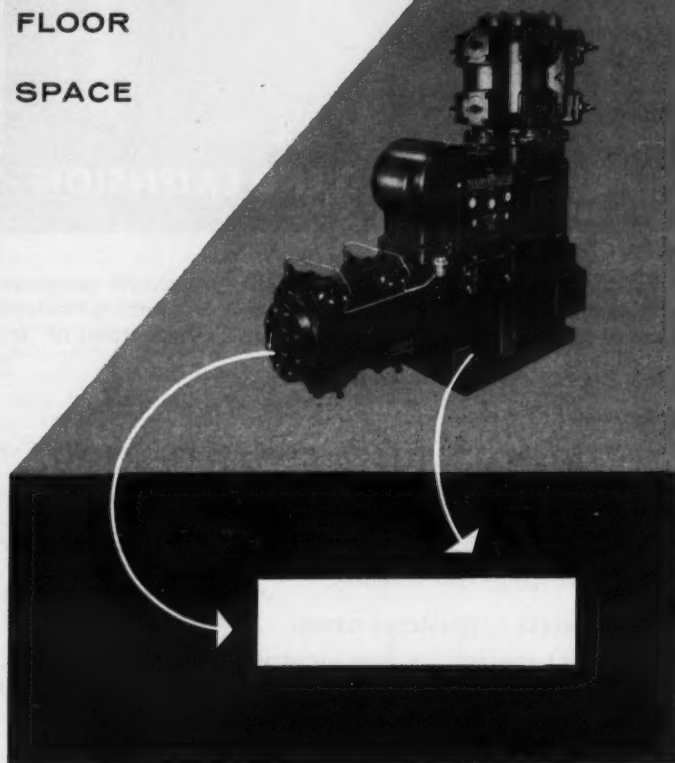
PRESSURE VESSEL CONNECTIONS

See our standard line of pressure vessel connections on pages 448-449 in the 1959 Chemical Engineering Catalog.

LENAPE HYDRAULIC PRESSING & FORGING CO.
DEPT. 100 WEST CHESTER, PA.
RED MAN PRODUCTS

Check 1414 opposite last page.

NEW
ANGLE
COMPRESSOR
SAVES
VALUABLE
FLOOR
SPACE



Look at all the space you save with the Pennsylvania HAE Angle Compressor. The 150 HP size, shown here, takes only 5' 5" x 7' 2" of floor space, including motor.

Now you can get efficient air service in a small space. It's the Pennsylvania HAE Angle Compressor—a dependable, two-stage, water-cooled double-acting compressor, built for continuous, heavy duty service. Designed with one vertical low pressure cylinder and one horizontal high pressure cylinder, it's compact, self-contained, pressure lubricated and ready to run when installed.

The HAE uses the same highly-efficient, trouble-free Air Cushion Valve found in all Pennsylvania Compressors. Its unique design eliminates use of bolts, nuts or screws likely to burn fast or work loose. Life is prolonged, maintenance diminished. For full information on Pennsylvania HAE Angle Compressors, write for your free copy of Bulletin 625.

PENNSYLVANIA PUMP AND COMPRESSOR CO.
EASTON, PA. • Earning customer confidence since 1920

Check 1415 opposite last page.

NEW LITERATURE

Polyethylene, its characteristics, applications, and markets are presented in 32-page product brochure. There are 27 charts illustrating technical aspects of properties and production. "Polyethylene" — Spencer Chemical Company, Dwight Building, Kansas City 5, Mo.

Check 1416 opposite last page.

Immersion-tube heating is topic of four-page bulletin, which is third in a series on this subject. This issue considers bonus advantages of immersion firing. Bul 3 — Sellers Engineering Company, 4876 N. Clark St., Chicago 40, Ill.

Check 1417 opposite last page.

Chemical equipment, including mixers and various types of material-handling equipment, is cataloged in Chemical Equipment Cat — S. Howes Co., Inc., Silver Creek, N. Y.

Check 1418 opposite last page.

Silicone rubber data on applications, typical properties, primary classes, and standard specifications are given full treatment in Silicone Rubber Selector Chart — Silicone Products Dept., General Electric Co., Waterford, N. Y.

Check 1419 opposite last page.

Linear conversion table, which gives decimal-foot equivalents for inches and fractions of inches, is contained on single-sheet Table TDC 110—Tubular Products Division, The Babcock & Wilcox Company, Beaver Falls, Pa.

Check 1420 opposite last page.

Welding fittings of stainless steel are covered in 20-page Cat GW 1-59—G & H Products Corporation, 5601 52nd St., Kenosha, Wis.

Check 1421 opposite last page.

Propellant-actuated devices, including normally closed valves and electrical disconnects, which have particular application in the missile field are discussed in illustrated Forms DIS-459 and PAV-459 — Beckman & Whitley, Inc., San Carlos, Calif.

Check 1422 opposite last page.

Diaphragm valves, which have discs to provide complete shut-off in case of diaphragm failure, are listed in Bul 800—W. S. Rockwell Company, 2209 Eliot St., Fairfield, Conn.

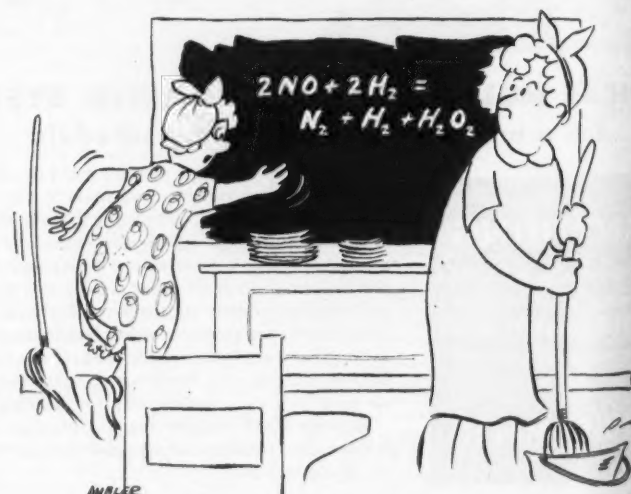
Check 1423 opposite last page.

Milk drying plant capable of turning out 175 lb of milk powder an hour is described in four-page bulletin. Features, dimensions, and specifications of the package-design plant are listed. "Package Milk Drying Plant" — Dairy Equipment Division, Blaw-Knox Company, 24 North Walnut St., Mora, Minn.

Check 1424 opposite last page.

Slide rule for polyethylene film and bag measurement permits rapid calculations with only one or two constants known. Tech Develop. Information 1513—U.S. Industrial Chemicals Co., Division of National Distillers and Chemical Corporation, 99 Park Ave., New York 16, N. Y.

Check 1425 opposite last page.



"Quick, Erma, the chalk! They left an unstable intermediate in here!"

NEW LITERATURE

Electromagnetic pulleys have applications and operation principle detailed in eight-page bulletin. Tables and formulas aid in size selection. Another table gives approximate weights per cubic foot of 146 materials often handled on belt conveyors. Bul 1011—Stearns Magnetic Products, A Division of The Indiana Steel Products Company, 635 S. 28th St., Milwaukee 46, Wis.

Check 1426 opposite last page.

Case imprinters which are automatic are reported in engineering data sheet. Device imprints one to four vertical panels of corrugated cases. Packomatic Case Imprinters—J. L. Ferguson Company, PO Box 1226, Joliet, Ill.

Check 1427 opposite last page.

Rotary pumps, available in sizes of $\frac{3}{8}$ to 8" for pressures to 200 lb and capacities to 1050 gpm, are summarized in Rotary Pump Literature—The Deming Co., 1007 Broadway, Salem, Ohio.

Check 1428 opposite last page.

Hopkins process for producing high-purity metals is topic of eight-page brochure. Relative merits of material produced are illustrated with photographs of macro-etch discs. "The Hopkins Process"—Firth Sterling Inc., 3119 Forbes Avenue, Pittsburgh 30, Pa.

Check 1429 opposite last page.

Nitrogen tetroxide information and application data are subject of 59-page bulletin, "Nitrogen Tetroxide"—Dept. NT13-2-1, Nitrogen Division, Allied Chemical Corporation, 40 Rector St., New York 6, New York.

Check 1430 opposite last page.

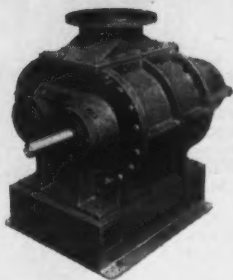
Petrochemical processes, products, and contract services, such as engineering and management consultation, offered by company are covered in eight-page Corporate Brochure—Houdry Process Corporation, 1528 Walnut St., Philadelphia 2, Pa.

Check 1431 opposite last page.

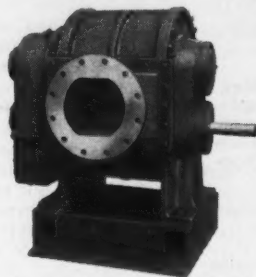
Filtration is considered in Filter Data—Dept. CPF-1059, Filtration Engineers Division, American Machine and Metals, Inc., East Moline, Ill.

Check 1432 opposite last page.

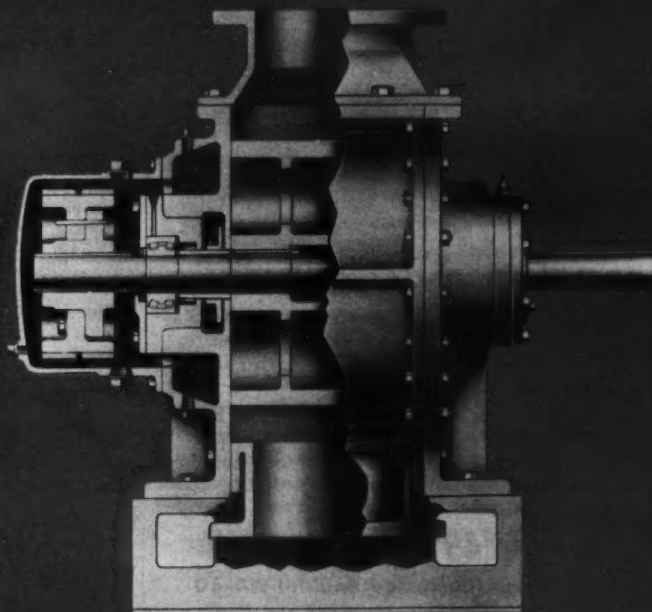
Electric motors, rated from 10 to 150 hp, are detailed in four-page brochure. Brochure SB 186 is available to qualified persons directly from Marathon Electric Manufacturing Corporation, Wausau, Wis., upon receipt of written request on company letterhead.



Series 400 Blowers are manufactured of close-grain cast iron, reinforced to prevent distortion under severe conditions.



Series 400V, same as above, mounted vertically. Extended bases provided at additional cost, for mounting motor and drive.



NEW "400" SERIES SUTORBILT ROTARY POSITIVE BLOWERS

with oil-free operation and
easy-to-adjust timing hub for peak efficiencies

Designed for heavy-duty, continuous delivery of precisely metered air or gas, the new "400" Series Sutorbilt blowers are available in 30 sizes—from $1\frac{1}{2}$ to 40 cubic foot displacement. Because Sutorbilt blowers require no lubrication, compressed air or gas is oil-free—an important feature to food, chemical and other industries.

Easy-to-adjust timing hub lets you re-time the new "400" series right on location. Without removing the unit from the line, you simply slacken hub bolts and remove locking pins from impeller gears to adjust internal clearance. This is accomplished in a few minutes

with the Sutorbilt timing hub. No disassembling for adjustment!

Other features of Sutorbilt "400" Series blowers include wideface herringbone timing gears that minimize wear and maintain close impeller tolerances. Impeller shafts turn on four oversize, heavy-duty roller bearings that keep shafts in perfect alignment and lower mechanical friction.

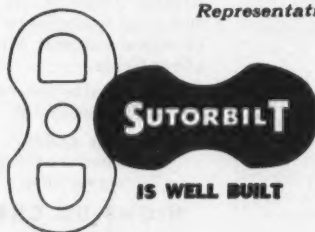
For long, maintenance-free service plus peak, positive pressure through the years, specify Sutorbilt blowers. Write for illustrated brochure S-65C giving complete specifications.

Representatives in principal cities. Consult your Classified Telephone Directory.

See our exhibit at Chem Show
New York Coliseum
November 30 — December 4

SUTORBILT CORPORATION, 2966 EAST VICTORIA ST. • COMPTON, CALIF.

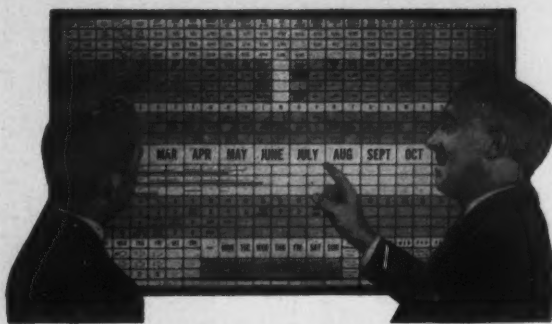
SUBSIDIARY OF FULLER COMPANY • CATASAUQUA, PA.



1322
S-15

Check 1433 opposite last page.

How To Get Things Done



BOARDMASTER VISUAL CONTROL

Gives you a Graphic Picture of your operations, spotlighted in color. You See what is happening at a glance. Facts at eye level — saves you time, prevents errors.

Simple, flexible — easily adapted to your needs. Easy to operate. Type or write on interchangeable cards, snap in grooves. Ideal for production, scheduling, sales, traffic, inventory, etc. Made of metal. Compact, attractive.

Complete Price \$49⁵⁰ including Cards

FREE

24-Page Illustrated Booklet AA-30
Mailed Without Obligation

GRAPHIC SYSTEMS

55 WEST 42nd STREET
NEW YORK 36, N. Y.

Check 1434 opposite last page.

CONTROL AIR POLLUTION!

FREE BROCHURE TELLS YOU HOW

Now learn how you can clean up combustible pollutants, fumes and odors from your processes. An Oxy-Catalyst System can be engineered to your special requirements. Catalytic oxidation is the most effective air pollution control and waste heat recovery method ever developed! Installation often leads to actual fuel savings. Investigate! Send today for brochure, "Oxycat Systems" — packed with facts and figures on typical industrial installations. Mail coupon below.



OXY-CATALYST, INC. Wayne 7, Pa., U.S.A.

Catalysts for fume and odor elimination, air pollution control and waste heat recovery

Send me free brochure, "Oxycat Systems"

Name _____
Firm _____
Street _____
City _____ Zone _____ State _____

Check 1435 opposite last page.

NEW LITERATURE

Stream splitter for separating a single stream of dry, free-flowing material into two to eight separate uniform streams is illustrated, specified, and described in two-page Bul 137-C — Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pa.

Check 1436 opposite last page.

Teflon-coated glass fabrics and adhesive tapes are detailed in four-page folder which charts strength, dielectric, and moisture-resistant characteristics of materials. Bul 58-2—Dodge Fibers Corporation, Hoosick Falls, N.Y.

Check 1437 opposite last page.

Sealless pumps' relative head-capacity performances are graphically represented on Composite Curve Graph—Chempump Division, Fostoria Corporation, Huntingdon Valley, Pa.

Check 1438 opposite last page.

Filtration cycle of semi-continuous plate-and-frame filter is illustrated by means of 12 drawings in eight-page, full-color bulletin. Automated features and improved labor saving design of the Eimco-Burwell Filter are explained. Bul F-2052 — The Eimco Corporation, P. O. Box 300, Salt Lake City 10, Utah.

Check 1439 opposite last page.

Tank gage of manometric type is specified in Bul L-10—The Meriam Instrument Company, 10920 Madison Ave., Cleveland 2, Ohio.

Check 1440 opposite last page.

Laboratory glassware and accessories are itemized in Cat 60 — Ace Glass Incorporated, Vineland, New Jersey.

Check 1441 opposite last page.

Centrifugal for automatic processing is reviewed in Batch-O-Matic® Literature — Tolhurst® Centrifugals, Division of American Machine and Metals, Inc., Dept. CPT-1095, East Moline, Ill.

Check 1442 opposite last page.

Phosphate determination with automatic chemical analysis equipment is explained in Phosphate Methodology Sheet — Technicon Controls, Inc., Chauncey, N.Y.

Check 1443 opposite last page.

Bulk-handling system, based on metal containers and filling and discharging equipment, is outlined in Bulk Handling Cat—Tote System, Inc., 680 S. 7th, Beatrice, Nebraska.

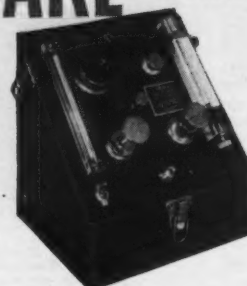
Check 1444 opposite last page.

TAKE

GUESSWORK

OUT

of
DEW POINT
READING
with



Alnor® DEWPOINTER

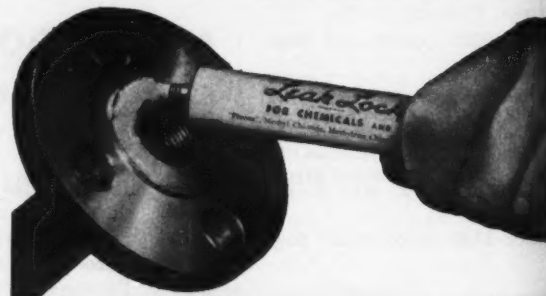
Any shop man can quickly...accurately...read dew points with the Dewpointer. It is the only instrument that lets you see the fog in a sealed chamber under controlled conditions. Compare this fast, positive method with attempts made to tell exactly when fog forms on a mirrored surface. Completely self-contained, requires no external coolant or auxiliary apparatus...operates on enclosed battery or AC. Available in three ranges for dew points between -20° F. and room temperature, from -80° to 0° F. and -80° F. to room temperature.

Send for Dewpointer bulletin. Tear out this ad and send on your letterhead to: Illinois Testing Laboratories, Inc., Room 504, 420 N. LaSalle St., Chicago 10, Ill.



PRECISION INSTRUMENTS
FOR EVERY INDUSTRY

Check 1445 opposite last page.



Leak Lock STOPS LEAKS where other compounds fail!

Here's a simple, economical solution to many troublesome leaking joint problems. Leak Lock holds LP, gasoline, oils, gases, petro-chemicals and refrigerants that eat through ordinary joint compounds. It's remarkably tough, highly adhesive, remains flexible indefinitely... the joint compound that stretches rather than breaks. Years of use have established its advantages in stopping wasteful or hazardous leaks in the petroleum, chemical, atomic energy, electronic, refrigeration and other fields.

Approval by Underwriters Laboratories for Gas and Oil Equipment List: Also for Propane and Butane.



FREE SAMPLE—Leak Lock is available in handy tubes and in cans. Write on your letterhead for sample tube.

HIGHSIDE CHEMICALS INCORPORATED
16 Colfax Avenue • Clifton, N. J.

Check 1446 opposite last page.

CHEMICAL PROCESSING

Spray Nozzle types

choice of over 12,000 basic designs

materials

brass, stainless steel, lead, hard rubber, hardened steel, tungsten carbide and many others.

performance

uniform distribution with spray angle, capacity, impact and atomization to your specifications.

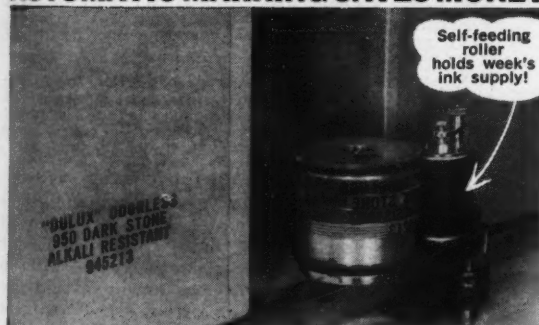
to improve every spraying operation

Improve performance, lower spraying costs with Spraying Systems spray nozzles. Prompt delivery. For complete information write for Catalog 24.

SPRAYING SYSTEMS CO.
3216 RANDOLPH ST. • BELLWOOD, ILL.
ADVANCED SPRAY NOZZLE DESIGN FOR NEW DIMENSIONS IN CONTROL AND PERFORMANCE

Check 1447 opposite last page.

AUTOMATIC MARKING SAVES MONEY



Self-feeding roller holds week's ink supply!

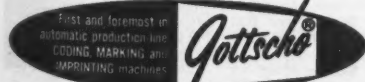
New ROLACODER conveyor and case-sealer attachment marks boxes, cartons, drums, filled bags automatically

Saves on container printing costs...eliminates hand-stamping...insures faster identification

- Low-cost... pays for itself in months
- Compact... works by friction... requires no troublesome adjustments
- Install it yourself on any conveyor, case-sealer, etc. to mark from side or top
- Not a gadget — beautifully designed and precision-made to give consistently dependable performance, uniform impressions
- Patented type base holds type and dies securely, makes copy changing easy
- Spots imprints accurately in any desired location
- Many thousands in use by all industries

Models to suit every need... including twin-action units for marking 2 or 4 sides of cases simultaneously.

Write today for Bulletin "ROL-3"



GOTTSCHO Dept. W
HILLSIDE 5, N.J.

In Canada: Richardson Agencies, Ltd. • Toronto & Montreal
Booth 712 • PMMI SHOW • New York • Nov. 17-20

Check 1448 opposite last page.

NEW LITERATURE

Control valves, bodies, and actuators are listed in 20-page Bul 150 — DeZurik Corporation, Sartell, Minnesota.

Check 1449 opposite last page.

Dry pulverizing of materials to micron-size powders, is topic of four-page bulletin. Specifications for eight various size jet pulverizers are listed. "The Jet Pulverizer" — The Jet Pulverizer Company, Rt 73, Palmyra, N. J.

Check 1450 opposite last page.

Storage tanks, of horizontal and vertical types, are pictured in 12-page Bul 574—The Day Company, 852 Third Ave., N.E., Minneapolis 13, Minn.

Check 1451 opposite last page.

Tall oil ethoxylate, a non-ionic detergent, is described in two-page technical bulletin. Various formulating suggestions are given. Tech Bul 659-1—Sole Chemical Corporation, 27 East Monroe St., Chicago, Ill.

Check 1452 opposite last page.

Turbine-type flowmeters are presented in eight-page pamphlet, which contains photographs, selection table and pressure-drop graph —The Potter-Bowser Meter Division, Bowser Inc., Box 1426, Union, N. J.

Check 1453 opposite last page.

Epoxy resin potting compounds are reviewed in two-page technical data sheet. Included is information on typical physical properties, prices, etc. for five formulas. Tech Data Sheet 110-B—Bacon Industries, Inc., 192 Pleasant St., Watertown 72, Mass.

Check 1454 opposite last page.

Metering pumps are subject of Bul 1257-1—Milton Roy Company, 1300 E. Mermaid Lane, Philadelphia 18, Pa.

Check 1455 opposite last page.

Stand-up, end-control trucks' role and uses in material handling systems are portrayed in eight-page booklet. "Docker Facts and Factors" — Automatic Transportation Company, Div. of Yale & Towne Manufacturing Company, 149 West 87th St., Chicago 21, Ill.

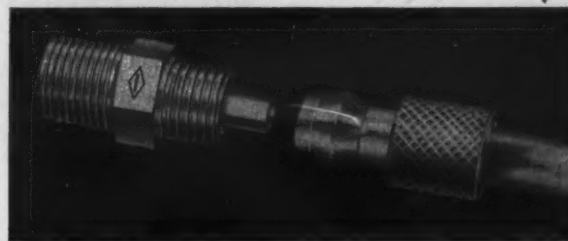
Check 1456 opposite last page.

Water hammer is expanded upon in a bulletin which considers its cause, effect and control. Bul 851 —The Williams Gauge Co., Inc., 2 Gateway Center, Pittsburgh 22, Pennsylvania.

Check 1457 opposite last page.

IMPERIAL Engineering and Data Digest

ENGINEERED TUBE FITTINGS — VALVES — TUBING TOOLS



Poly-Flo tube fittings cut time and labor costs up to 93%

Here's why instrumentation, and pneumatic circuit design engineers and many others prefer Imperial Poly-Flo tube fittings and color-coded Polyethylene tubing:

- Time and labor savings up to 93% have been reported with Poly-Flo fittings and polyethylene tubing as compared to metal tubing.
- Polyethylene tubing bends readily by hand.
- Fittings need only be finger-tightened.
- Working pressures to 125 psi ($\frac{1}{4}$ " O.D.); 160 psi ($\frac{3}{8}$ " O.D.); 100 psi ($\frac{1}{2}$ " O.D.).
- Temperature range: -90° F. to 175° F.

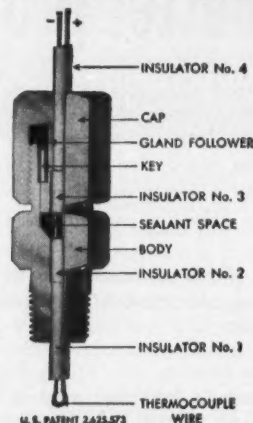
Write for Bulletin No. 3025-C for full facts

THE IMPERIAL BRASS MFG. CO.
Dept. CPR-109
6300 W. Howard St., Chicago 48, Ill.
In Canada: 18 Hook Ave., Toronto, Ont.

Check 1458 opposite last page.

Fast Response

conax® BARE WIRE THERMOCOUPLE GLANDS



provide the only simple, positive method for sealing two or more bare wires at pressures from full vacuum to 20,000 psi.

Low mass, unshielded, bare wire thermocouples give almost instantaneous response to temperature changes assuring greater accuracy of measurement and control.

- Temperature range — -300°F to +1850°F
- All stainless steel construction
- Complete range of sizes
- Available from stock

WRITE FOR CONAX DATA BOOK SHOWING COMPLETE LINE OF THERMOCOUPLE ASSEMBLIES AND PRESSURE SEALING GLANDS.

conax corporation
2314 Walden Ave., Buffalo 23, New York

Check 1459 opposite last page.

LESS LINER! MORE GLOVE!



Photomicrograph of a cross section of a typical North PVC glove. Notice the extra-thick coating. That's where the wear is!

That's why North PVC gloves by Jomac give longer service... better protection!

When you compare gloves, remember this: we use a special light-weight knitted liner and *extra coating*. Some manufacturers use heavy cotton flannel liners and *less coating*. Although total weights may be the same, you get a better value with North PVC gloves, because you're paying for gloves... not liners! The wear, after all, is in the coating.

And that isn't all! We offer a better selection of sizes... and that means greater comfort, greater dexterity, greater productivity for every worker on every job.

FREE OFFER! On your business letterhead, send us complete details of your working conditions, and we will send you a sample pair. Do it today!

JOMAC INDUSTRIAL GLOVES

Jomac Incorporated, Dept. N, Philadelphia 38, Pa.

Plants in Philadelphia, Pa., and Warsaw, Ind.
In Canada: Safety Supply Company, Toronto
In Europe: North-Jomac Ltd., London, W1

Check 1460 opposite last page.

NEW LITERATURE

Steel-strapping tool is shown in action in eight-page catalog. Pneumatically powered, tool tensions, seals, cuts. Cat AD 251—Acme Steel Products Division, Acme Steel Company, 135th St. & Perry Ave., Chicago 27, Ill.

Check 1461 opposite last page.

Feed-water-control systems are clarified in eight-page bulletin, incorporating detailed schematic diagrams. Bul 530 — Bailey Meter Company, 1050 Ivanhoe Road, Cleveland 10, Ohio.

Check 1462 opposite last page.

Conveyors and elevators are itemized in Buls 576 and 577—The Manufacturers Equipment Company, 218 Madeira Ave., Dayton 4, Ohio.

Check 1463 opposite last page.

Modular-enclosure-system basic frames and components are presented in 16-page Condensed Cat 106—Elgin Metalformers Corporation, 630 Congdon Ave., Elgin, Illinois.

Check 1464 opposite last page.

Polyethylene film standards which U. S. Department of Commerce circulated for approval are previewed in four-page technical data bulletin, available from U. S. Industrial Chemicals Company, Div. of National Distillers and Chemical Corporation, 99 Park Ave., New York 16, N.Y.

Check 1465 opposite last page.

Pumps, of horizontal and vertical types, are specified in Buls C-355 and V-837, respectively — Taber Pump Co., 291 Elm St., Buffalo 3, New York.

Check 1466 opposite last page.

Shaft-motion indicator, with operating speeds of 10 to 150 rpm, is covered in Bul RG-16—The Indicator Company, 13946-D Kercheval, Detroit 15, Mich.

Check 1467 opposite last page.

Safety test, designed to predetermine accident-causing "injury repeater", is outlined in eight-page Safety Test Brochure — Executive Assets, Inc., 17 Battery Pl., New York 4, N. Y.

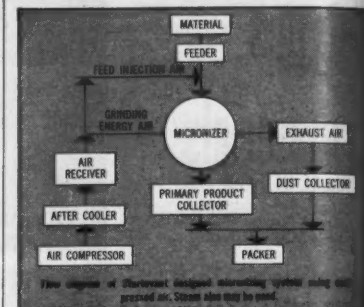
Check 1468 opposite last page.

Steam traps, which continuously test for condensate in line ahead of trap and operate to discharge it as soon as it forms, are covered in Steam Trapping Bul—Yarnall-Waring Co., 125 Mermaid Ave., Philadelphia 18, Pa.

Check 1469 opposite last page.

Need ½ to 44 Microns?

**Sturtevant Micronizers*
Make 325 Mesh Obsolete**



**One Operation
Reduces, Classifies**

Sturtevant Micronizers grind and classify in one operation in a single chamber—provide fines in range from ½ to 44 microns to meet today's increased product fineness needs. Can handle heat-sensitive materials.

*Production Model
(15 in. chamber)*

No Attritional Heat

Particles in high speed rotation, propelled by compressed air entering shallow chamber at angles to periphery, grind each other by violent impact. Design gives instant accessibility, easy cleaning. No moving parts.

Classifying is Simultaneous

Centrifugal force keeps oversize material in grinding zone, cyclone action in central section of chamber classifies and collects fines for bagging. Rate of feed and pressure control particle size.

Eight Models Available

Grinding chambers range from 2 in. diameter laboratory size (½ to 1 lb. per hr. capacity) to large 36 in. diameter production size (500 to 4000 lbs. per hr. capacity). For full description, request Bulletin No. 091.

Engineered for Special Needs

A 30 in. Sturtevant Micronizer is reducing titanium dioxide to under 1 micron at feed rate of 2250 lbs. per hr. For another firm, a 24 in. model grinds 50% DDT to 3.5 average microns at a solid feed rate of 1200-1400 lbs. per hr. A pharmaceutical house uses an 8 in. model to produce procaine-penicillin fines in the 5 to 20 micron range. Iron oxide pigment is being reduced by a 30 in. Micronizer to 2 to 3 average microns.

Sturtevant will help you plan a Fluid-Jet system for your ultra-fine grinding and classifying requirements. Write today.

Can Test or Contract Micronizing Help You?

Test micronizing of your own material, or production micronizing on contract basis, are part of Sturtevant service. See for yourself the improvement ultra-fine grinding can contribute to your product. Write for full details. STURTEVANT MILL CO., 119 Clayton St., Boston, Mass.



*REGISTERED TRADEMARK OF STURTEVANT MILL CO.

Check 1470 opposite last page.

CHEMICAL PROCESSING

NEW LITERATURE

Stainless-steel fabrication is discussed in the two pamphlets, "Sheet and Plate Fabrication" and "Electrical Enclosures"—The Kirk & Blum Manufacturing Co., 3133 Forrer St., Cincinnati 9, Ohio. Check 1471 opposite last page.

Load cells, available in standard capacities of 50 to 200,000 lb and accuracies to $\pm 0.1\%$, and batching systems are considered in Buls 4355 and 4510—Dept. 16-J, Electronics & Instrumentation Division, Baldwin • Lima • Hamilton, Waltham, Mass.

Check 1472 opposite last page.

How to choose a high-vacuum still is told in 16-page brochure. History and theory of high-vacuum distillation is also reviewed. Bul 3-1 — Rochester Division, Consolidated Electrodynamics Corporation, 1775 Mt. Read Blvd., Rochester 3, N. Y.

Check 1473 opposite last page.

Zinc oxide's use in rubber compounding is presented in first issue of 20-page publication in which many important physical and chemical properties are summarized. Vol 13, No. 1, "The Activator" — The New Jersey Zinc Company, Inc., 160 Front St., New York 38, N.Y.

Check 1474 opposite last page.

Tube fittings, for working pressures to 125 psi ($\frac{3}{4}$ " OD) and in temperature range of -90 to $+175^\circ\text{F}$, are itemized in Bul 3025-C—Dept. CPR-109, The Imperial Brass Mfg. Co., 6300 W. Howard St., Chicago 48, Ill.

Check 1475 opposite last page.

Differential pressure transmitters for low flow rate measurements of gases or liquids are covered in four-page Specification Sheet 10B-1460 — Fischer & Porter Company, 215 Jacksonville Rd., Hatboro, Pennsylvania.

Check 1476 opposite last page.

Dispersion mills are delineated in four-page bulletin. Four sizes of 3-roll units are described in Bul 158—The J. H. Day Company, Division of The Cleveland Automatic Machine Company, 4900 Beach St., Cincinnati 12, Ohio.

Check 1477 opposite last page.

Tower packing is reviewed in booklet which considers various aspects of subject at length and includes pertinent charts. "Harshaw Tellerette"—The Harshaw Chemical Co., 1945 E. 97th St., Cleveland 6, Ohio.

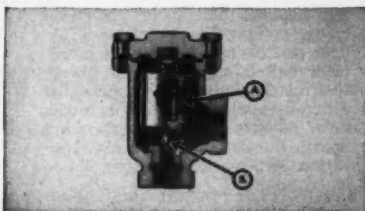
Check 1478 opposite last page.

Full-range steam traps cut high cost of steam pressure variations

By John W. Ritter, Test Engineer
SARCO Company, Inc.

While boiler room economics dictate that boiler pressures remain constant, the equally sound economics of batch processing may decree that pressures at the equipment vary with the requirement of the process. The attempt to choose a steam trap that is all things to all conditions may result in installing traps that operate inefficiently at either extreme of their pressure range or that require adjustment every time the operations sheet calls for another pressure-temperature setting. Orifice traps represent a somewhat more rational approach to the problem, but often at the price of a continuous discharge of steam, particularly at the low pressures of start-up and shut down. Compromise, adjustment, and steam waste all spell inefficiency in the utilization of steam.

Production-Planned steam trapping, on the other hand, improves efficiency by the use of properly designed and installed thermostatic steam traps. Such traps employ the expansion and contraction of a thermostatic element to operate the discharge valve.



In Sarco Thermostatic Steam Trap, element (A) expands at steam temperature to close valve (B), contracts to permit discharge of condensate.

In the Sarco "Balanced Pressure" Thermostatic Steam Trap a volatile fluid is sealed inside a metal bellows that opens or closes the valve as it contracts or expands with condensate temperature. Near steam temperature, evaporation of the fluid creates an internal pressure greater than steam pressure in the trap body, and the expanding bellows seats the valve. When the condensate cools, the element contracts and opens the valve.

It is evident that at steam temperature pressure inside the element is higher than steam pressure, no matter how the latter may vary. Thus, the trap compensates automatically for variations in pressure.

58108

SARCO

COMPANY, INC.

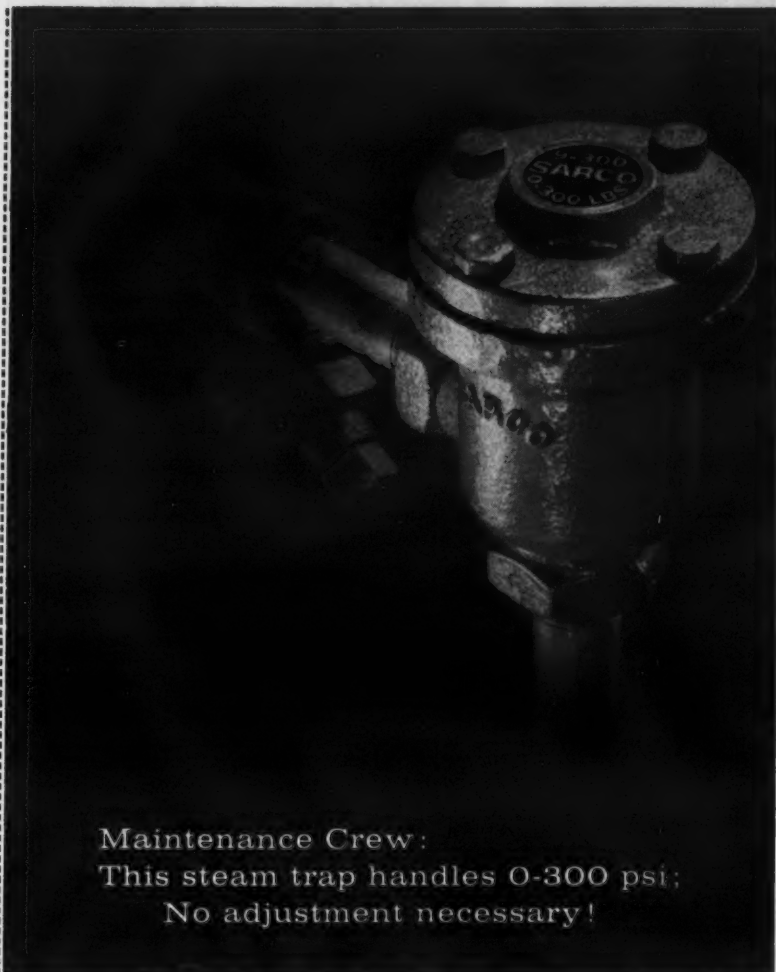
635 Madison Ave., New York 22, N. Y.

STEAM TRAPS • TEMPERATURE CONTROLLERS • STRAINERS • HEATING SPECIALTIES

Only Sarco makes all 5 types:

Thermostatic • Liquid Expansion • Float Thermostatic
Thermo-Dynamic • Bucket

Check 1479 opposite last page.



Maintenance Crew:

This steam trap handles 0-300 psi;
No adjustment necessary!

Sarco "Balanced Pressure" Thermostatic Steam Traps cut trap maintenance costs and simplify parts inventory. Why? Because the same bellows, head and seat handle steam pressures up to 300 psi — without any need of adjustment for variations in load or pressure.

Other advantages: unmatched capacity/cost ratio (1" size discharges 9,650 lbs/hr. at 10°F below steam temperature, 125 psi). This trap can't air-bind and, when installed with free discharge, can't freeze.

Long life and reliable performance are assured by an exclusive Sarco process for fabricating the one moving part — the thermostat — and by steam-testing of every single trap at maximum rated pressure.

Write for "Literature Kit 1A" today. And remember, Sarco can give you impartial advice on *Production-Planned steam trapping* because...

DAY

Pneumatic Conveying & Bulk Storage News

FREE! 2 valuable guides
for selecting
**PNEUMATIC CONVEYING
and BULK STORAGE TANKS**



BULLETIN M-588—12 page DAY pneumatic conveying guide just off the press. Discusses types of systems, illustrates and diagrams high and low density arrangements, shows equipment and tells "why" and "wherefore" of all types of pneumatic conveying including so-called fluidizing systems.

BULLETIN 574—12 pages, describes horizontal and vertical storage tanks. Points out savings and is filled with photos of various installations plus description of auxiliary equipment.



Whatever your pneumatic conveying or bulk storage problem, look first in these DAY bulletins. They are valuable aids in selecting and ordering the right equipment for your plant. For your free copies use reader service card of this magazine or write direct to DAY.

The DAY Company

SOLD in UNITED STATES by
The DAY SALES Company
852 Third Avenue N.E.
Minneapolis 13, Minnesota



MADE and SOLD in CANADA by
The DAY Company of Canada Limited
Rexdale (Toronto), Ontario, Canada
St. William, Ontario, Canada

Representatives in Principal Cities

EQUIPMENT ONLY OR A COMPLETE SYSTEM

Check 1480 opposite last page.

NEW LITERATURE

Translations of 107 Soviet research reports dealing with lanthanide and actinide elements are included in 657-page collection covering years 1949-1957. Divided into five sections which may be purchased separately or as set, book is obtainable from publisher only. Table of contents is available from Consultants Bureau, Inc., 227 West 17th St., New York 11, N. Y.

Check 1481 opposite last page.

Proper cleaning procedures, for laboratory and hospital glassware, utensils, instruments, and equipment, are tabulated on 11 x 17" Cleaning Guide—Alconox, Inc., 63 Cornelson Ave., Jersey City, New Jersey.

Check 1482 opposite last page.

Tank mixer with high-shear impeller is specified in engineering and performance data. Tank Mixer Data—American Well Works, 122 N. Broadway, Aurora, Ill.

Check 1483 opposite last page.

Hand pumps are presented in Buls 310 and 320—Blackmer Pump Company, Grand Rapids 9, Mich.

Check 1484 opposite last page.

Ten benefits that can be gained by using radiant heater clusters for heat processing are covered in 12-page bulletin. Photographs of actual installations and schematics of different applications are included. Over 60 users of these heaters are listed. Bul DC-1—Selas Corporation of America, Dresher, Pa.

Check 1485 opposite last page.

Metholene esters for alkylolamides are covered in 8-page bulletin which also contains specifications for line of methyl esters and procedure for application. Tech Bul 415—Organic Chemical Sales Department, Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio.

Check 1486 opposite last page.

Hose of various types, available in wide range of materials for differing applications, is delineated in Hose Bulletins—Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, N. J.

Check 1487 opposite last page.

Glass-ceramic materials are discussed in the third in a series of progress reports contained in an eight-page brochure. Electrical, mechanical, thermal, and chemical properties are described. Progress Report PY-3 may be obtained by writing on company letterhead to Director of Marketing, Corning Glass Works, Corning, N.Y.

Liquid-atmospheric-gas-storage system is explained in Liqua-Guard System Bul—Dept. TA, Cambridge Corporation, 2 Industrial Ave., Lowell, Mass.

Check 1488 opposite last page.

Castable refractories and refractory bricks for use in the petrochemical field are presented in eight-page Refractories Bul—Harbison-Walker Refractories Company, 307 Fifth Ave., Pittsburgh 22, Pa.

Check 1489 opposite last page.

Ball bearings of deep-groove type are reviewed in 12-page bulletin incorporating detailed tables and drawings. Bul 110—Hoover Ball and Bearing Company, 5400 S. State Rd., Ann Arbor, Mich.

Check 1490 opposite last page.

Filter presses, which can be made with glass-reinforced polyester plates and frames, are included in Sperry Cat—D. R. Sperry & Co., Batavia, Ill.

Check 1491 opposite last page.

Electric heating elements of strip type are itemized in four-page Bul SHA—Acra Electric Corporation, Franklin Park, Ill.

Check 1492 opposite last page.

Pneumatic-bulk-truck information is summarized in Bul 205—Sprout, Waldron & Co., Inc., Muncy, Pa.

Check 1493 opposite last page.

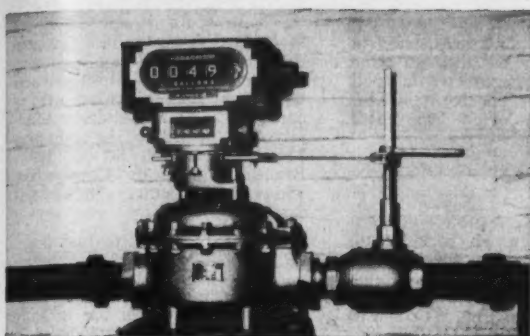
Pipe-protection tape of PVC in roll form is clarified in Pipe-tape Literature—Dept. EAO-109, Minnesota Mining and Manufacturing Company, 900 Bush Ave., St. Paul 6, Minn.

Check 1494 opposite last page.



CHEMICAL PROCESSING

It Figures!



METERING LIQUIDS SAVES YOU MONEY

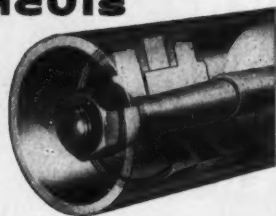
If you batch or blend liquids the automatic shut-off type Rockwell ER Industrial meter (pictured above) gives positive quantity control to stabilize the quality of your end product. You'll eliminate the need for costly weigh tanks and laborious handling—also gain the advantage of a closed piping system.

Throughout your plant Rockwell meters spell advantages wherever liquids are piped or used—for inventory and department controls; for tax records, etc. Our bulletins tell all. Write Rockwell Manufacturing Company, Pittsburgh 8, Pa.



Check 1495 opposite last page.

KEEP EFFICIENCY HIGH with DARCOVA



A LOT of dollars go slipping right past the pistons of reciprocating pumps and cylinders that must be frequently repacked. But Darcova Puncups keep pump efficiency up, hold slippage and maintenance down!

Because of Darcova's unique design, true texture engineering and precision manufacture, Puncups outlast other packing at least 3 to 1.

Why not judge for yourself? Get all the facts. Send today for informative Bulletin No. 5503

DARLING VALVE & MANUFACTURING CO.
Williamsport 4, Pa.



TRADE MARK
Puncups

Check 1496 opposite last page.

NEW LITERATURE

Self-loading truck, which can handle six sizes of containers, empties container contents into its packer body and compresses material to fraction of former volume. Information on this unit is contained in Dumpmaster Brochure—Dept. CP-10, Dempster Brothers, Knoxville 17, Tenn.

Check 1497 opposite last page.

Enzyme approach to fermentation reactions is detailed in "Understudy for a Microbe"—Development Department, Evans Research and Development Corporation, 250 E. 43rd St., New York 17, New York.

Check 1498 opposite last page.

Permanent-magnet separator of drum type, which utilizes ceramic magnet material, is detailed in Bul 1051B—Stearns Magnetic Products, Division of The Indiana Steel Products Company, 635 S. 28th St., Milwaukee 46, Wis.

Check 1499 opposite last page.

Filter assemblies, replacement filter elements, dual-bowl filters, and differential-pressure-indicator filter assemblies are detailed in six-page Cat BFD-64—Bendix Filter Division, Bendix Aviation Corporation, 434 W. 12 Mile Rd., Madison Heights, Mich.

Check 1500 opposite last page.

Dryers, kilns, coolers and other heavy rotary processing equipment are described in 28-page technical bulletin. Engineering graphs for use in making calculations for new drying and cooling installations are included. Dryer bulletin—Standard Steel Corporation, 5001 South Boyle Ave., Los Angeles 58, Calif.

Check 1501 opposite last page.

Vacuum pumps, in capacities of 4.3 to 225 cu ft/min, and compressors are treated in Pump and Compressor Cat—Lammert & Mann Co., Inc., 1753 Walnut St., Chicago 12, Ill.

Check 1502 opposite last page.

Purifiers, separators, mist extractors, and scrubbers are detailed in eight-page Bul 803—The V. D. Anderson Company, Division of International Basic Economy Corporation, 1935 W. 96th St., Cleveland 2, Ohio.

Check 1503 opposite last page.

Flow-actuated alarm is explained in Lube-Line Alert Spec. Sheet—Manzel, Unit of Houdaille Industries, Inc., 274 Babcock St., Buffalo 10, N.Y.

Check 1504 opposite last page.

FOR ABSOLUTE LABORATORY UNIFORMITY...



THE Marion MIXER

... IS STILL THE LEADER

FOR MIXING:

- Dry and Semi-Wet Chemical Powders
- Agricultural Chemicals
- Materials for the Plastics Industry
- Materials for Chemical Processing Plants
- Sweeping Compounds
- Pharmaceuticals
- Fertilizers

A uniform mix is assured time after time, no matter how complicated the formula, and with laboratory exactness. If the formula is right—the MARION MIXER will mix it with complete accuracy.

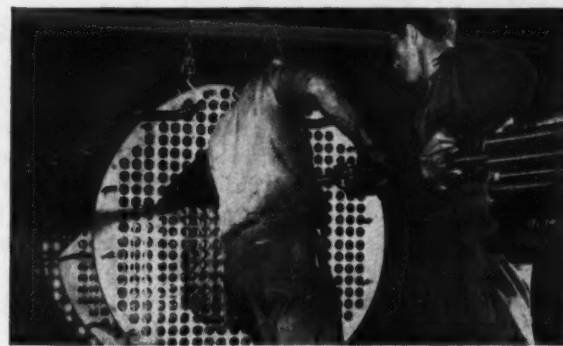
THE EXCLUSIVE MARION MIXING and BLENDING ACTION will handle any type of chemical materials and give a top quality mixed product at less cost.

Send Today For Free Descriptive Literature

RAPIDS MACHINERY COMPANY

865 11th Street Marion, Iowa

Check 1505 opposite last page.



Republic ELECTRUNITE Heat Exchanger Tubes offer QUALITY you can measure

CARBON STEELS • STAINLESS STEELS

Dependable . . . you bet! Republic ELECTRUNITE® Heat Exchanger Tubes are produced from highest quality flat-rolled steel, electrically welded by the exclusive ELECTRUNITE process that unites the tube under pressure without the addition of foreign metal. This process assures uniformity, strength, ductility, concentricity, and other physical properties to meet critical performance specifications. And, now you can specify FARROWTEST®, a production method of electronic testing, at no extra cost! Write for details.

REPUBLIC STEEL

STEEL AND TUBES DIVISION
207 East 131st Street • Cleveland 8, Ohio

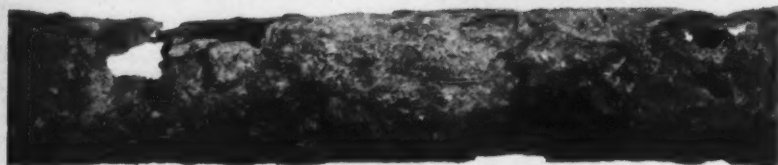


Check 1506 opposite last page.

THIS...

PLUS THIS...

STOPS THIS!



"SCOTCHRAP" Pipe Protection Tape stops corrosion due to electrolysis and chemical or bacterial attack

"SCOTCHRAP" BRAND Pipe Protection Tape is tough polyvinyl chloride plastic in convenient roll form—quality controlled for uniform electrical properties which include excellent insulation resistance and high electric strength. It offers a quick, low-cost method for protecting pipes, conduits, and other metal surfaces against corrosion. Tight-holding pressure-sensitive adhesive sticks at a touch—no flame, heat, or messy pots needed. *Safe and easy to apply* for spot protection or a whole system—by anyone. "SCOTCHRAP" Tape resists acids, alkalies, and solvents. Available in seven standard widths from 1 inch to 18 inches; in thicknesses of 10 and 20 mils.

Write for free technical literature including application information. Address: 3M Co., 900 Bush Ave., St. Paul 6, Minn., Dept. EAO-109.



"SCOTCHRAP" IS A REGISTERED TRADEMARK OF 3M CO., ST. PAUL 6, MINN.
EXPORT: 90 PARK AVE., NEW YORK 16, CANADA: LONDON, ONTARIO

SCOTCHRAP Pipe Protection Products

MINNESOTA MINING AND MANUFACTURING COMPANY

... WHERE RESEARCH IS THE KEY TO TOMORROW



Check 1507 opposite last page.

NEW LITERATURE

Rotary joint, which gets steam in and condensate out through same head, is one type covered in Joint Information—The Johnson Corporation, 826 Wood St., Three Rivers, Mich.

Check 1508 opposite last page.

Bucket cranes are subject of four-page bulletin which includes dimensions and other specifications for cranes handling 50- and 90-lb/cu ft materials. Bul B-102—Northern Engineering Works, 210 Chene St., Detroit 7, Mich.

Check 1509 opposite last page.

Pipe insulation, for temperatures to 1200°F in sizes to 44" OD and single-layer thicknesses to five inches, is specified in 40-page Cat F76-321—Union Asbestos & Rubber Company, 1111 W. Perry St., Bloomington, Ill.

Check 1510 opposite last page.

Centrifugal compressors are cataloged in 16-page Cat EM 59-2120—York Corp., subsidiary of Borg-Warner Corp., York, Pa.

Check 1511 opposite last page.

Metal processing service, ranging from design, installation, and service of variety of metal-preparation and finishing machines to compounds and chemicals themselves, is introduced in eight-page Metal Preparation Service Bul—Pennsalt Chemicals Corporation, Three Penn Center, Philadelphia 2, Pennsylvania.

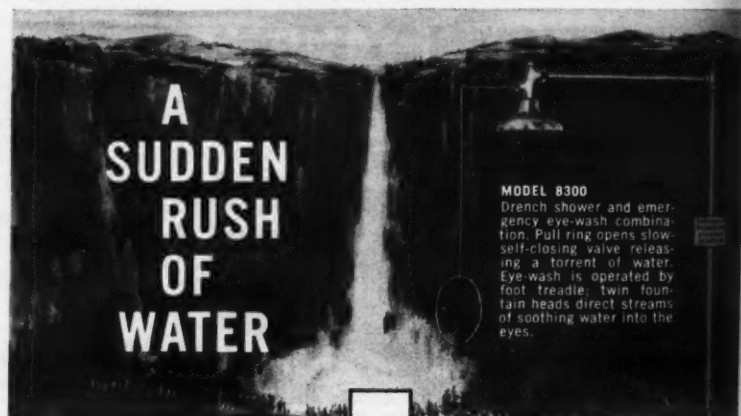
Check 1512 opposite last page.

Corrosion inhibitor, of fatty-nitrogen-derived type, for use in 5, 10 and 15% HCl, is introduced in Tech Develop. Information 1516—U.S. Industrial Chemicals Co., Division of National Distillers and Chemical Corporation, 99 Park Ave., New York 16, N.Y.

Check 1513 opposite last page.

Pallet-stacking frames which can be snapped into place for assembly are described in eight-page booklet. Drawings show step-by-step assembly procedure; two pages of photos picture various applications of the portable frame. Tier-Rack Brochure—Tier-Rack Corporation, 122 N. 7th St., St. Louis 1, Mo.

Check 1514 opposite last page.



MODEL 8300

Drench shower and emergency eye-wash combination. Pull ring opens slow-closing valve releasing a torrent of water. Eye-wash is operated by foot treadle; twin fountain heads direct streams of soothing water into the eyes.

for immediate **FIRST AID**
... in accidental
body contamination

Injurious chemicals are instantly washed away by the cascading water from Haws Drench Showers. Simple pull-chain or foot treadle valves release a sudden rush of water—saving valuable seconds until medical help arrives. Chances of permanent injury are minimized, and insurance claims correspondingly lessened. HAWS Emergency Drench Showers are available in models to meet virtually any industrial need. WRITE TODAY—to find out the full story!



DRENCH SHOWERS

A product of
HAWS DRINKING FAUCET COMPANY
1443 Fourth Street • Berkeley 10, California
EXPORT DEPT.: 19 Columbus Ave., San Francisco 11, Calif., U.S.A.

Check 1515 opposite last page.

CHEMICAL PROCESSING

NEW LITERATURE

Pressure cells, which have standard accuracy of $\pm 1/4\%$, are reviewed in Bul 4365—Dept. 16-J, Electronics & Instrumentation Division, Baldwin • Lima • Hamilton, Waltham, Mass.

Check 1516 opposite last page.

Gate valves, fabricated from bronze, are subject of two-page Circular 574—Lunkenheimer Co., Beekman, Waverly, and Tremont St., Cincinnati 14, Ohio.

Check 1517 opposite last page.

Paint fungicides are discussed in four-page folder which describes both mercurial and non-mercurial types. Occurrence, incidence and identification of mildew are pointed out. Cat. B-1—Nuodex Products Company, Div. of Heyden Newport Chemical Corporation, Elizabeth, N. J.

Check 1518 opposite last page.

Aluminum laboratory clamps are cataloged in eight-page Alumaloy Clamp Bul — Chicago Apparatus Company, 1735 N. Ashland Ave., Chicago 22, Ill.

Check 1519 opposite last page.

Chemical storage in molecular sieves is explained, uses of this ability told, and types of chemicals which can be loaded cited in six-page booklet, "Chemical Loaded Molecular Sieves" — New Products Department, Linde Company, division of Union Carbide Corp., 30 E. 42nd St., New York 17, New York.

Check 1520 opposite last page.

Panel-coil type heat-exchanger fitting arrangements can be seen at a glance on work sheets for both single-embossed (58) and double-embossed (59) type. Work sheets 58 and 59 — Dean Thermo-Panel Coil, Division of Dean Products, Inc., 616 Franklin Ave., Brooklyn 38, N. Y.

Check 1521 opposite last page.

Porcelain coatings on steel and other metals are covered in detail in comprehensive guide for engineers, compiled originally for the Navy. "Porcelain Enamel Defects Literature Review and Definitions," 126-page volume, may be purchased for \$2.75 from Office of Technical Services, U.S. Department of Commerce, Washington 25, D.C.

NEW AMWELL Tank Mixer

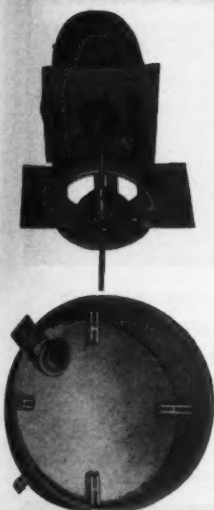
WITH HIGH-SHEAR IMPELLER

More Efficient for Mixing Dry Materials with Liquid

Uses high-shear impeller with controlled recirculating mixing to disperse a wide variety of highly cohesive solids in liquids. Positive flow impeller and high speeds (3500 RPM) develop the high shear without the disadvantage of close clearances. Can be furnished in single or multiple stages to accommodate a wide range of solid and liquid rates, for continuous or batch mixing.

Impeller rotates within a baffled draft tube. Feed materials are drawn into impeller suction eye and instantly dispersed. Baffles completely eliminate swirl and insure thorough tank turnover. Unique design and high velocity action insure passage of the raw feed through the high shear zone, promote thorough recirculation and prevent sedimentation. Ruggedly built. Standard materials are carbon steel, bronze and stainless steel. Special alloys can be provided.

Write for engineering and performance data.



AMERICAN WELL WORKS

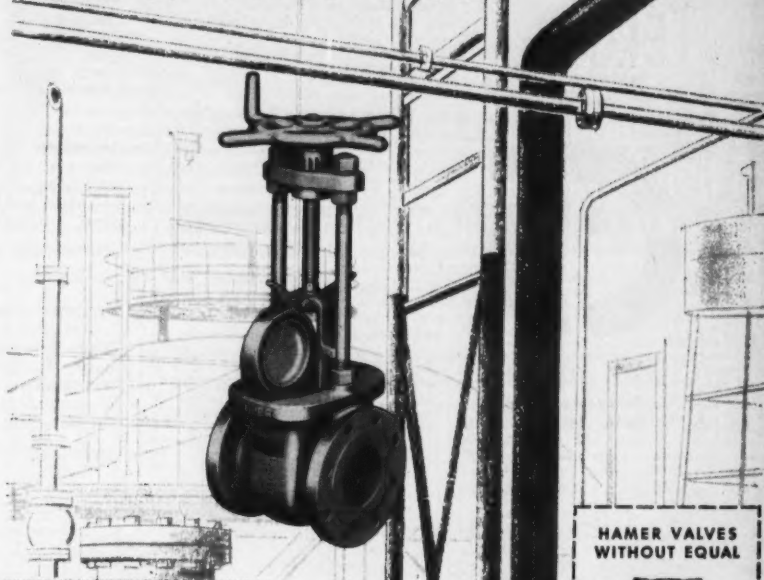
MIXING, PUMPING, WATER & WASTE TREATMENT EQUIPMENT
122 NORTH BROADWAY, AURORA, ILLINOIS
Sales Offices: Chicago, New York, and other principal cities

OUR
91st
Anniversary

Check 1522 opposite last page.

OCTOBER 1959

PUTTING THE "ABSOLUTE" IN LINE SHUT-OFF...



Hamer Line Blind Valves

It has long been recognized that convention type valves do develop leaks. And contamination of product when it occurs costs dearly in time and money. Preventing this is where Hamer Line Blinds excel. Handwheel or bar operated, Hamer Line Blind Valves squeeze dead tight against the center spectacle plate forming an impassable line shut-off that's both permanent and absolute. Yet Hamer Line Blinds are fast, safe, simple to operate. One man can open or blind a line in one minute. Investigate Hamer Line Blinds. Let a Hamer representative show you how these remarkable valves can actually pay for themselves.

SEND FOR FREE CATALOG

HAMER VALVES
WITHOUT EQUAL



Leak-proof Gate Valve



Line Blind Valve



Lift-type Plug Valve

159-3

Hamer VALVES

P. O. Box 1851
2919 Gardenia Ave., Long Beach 1, Calif.
Division of Chiksan Company

Check 1523 opposite last page.

199

... this **NO-COST TEST** OFFER has **CONVINCED** thousands ... send for **YOUR FREE** "TEST CAN" of C-5 "hi-temp" **ANTI-SEIZE THREAD COMPOUND!**



FEL-PRO C-5 "HI-TEMP" THREAD COMPOUND

1614-CR

"HIGH-TEMP"

- ✓ Ends Seizing and Galling even up to 1800°F.
- ✓ Reduces Wrench Torque
- ✓ Ends Stud Breakage
- ✓ Permits Repeated Re-use
- ✓ Speeds Assembly and Disassembly
- ✓ Protects Stainless Steel at all Temperatures

ANTI-SEIZE THREAD COMPOUND

C-5's exclusive colloidal copper formula separates mating metal threads and surfaces with cushioning, protective copper plating. C-5 prevents galvanic action and eliminates pitting even when dissimilar metals join. On mating metal surfaces, C-5 saves gaskets and countless man hours.

WRITE TODAY... For Your FREE Test Sample Can of C-5.

FELT PRODUCTS MFG. CO.
Dept. 54, P.O. Box 8609,
Chicago 80, Ill.

Check 1524 opposite last page.

... the answer to your **CONVEYOR AND ELEVATOR** problems ...



MECO
SINCE 1910

Whatever the materials to be handled ... the need for rugged, reliable, equipment ... MECO can supply the answer with Conveyors and Elevators, designed, engineered, and manufactured, to meet your specific requirements! MECO Conveyors and Elevators embody features and advantages gained in nearly 50 years of experience in the manufacture of material handling equipment—assure efficient, economical operation, and years of trouble-free service—are giving the utmost in satisfaction to numerous users in the chemical, plastics, ceramics, coal, sand and gravel, non-metallic and other industries.

MECO Centrifugal discharge Elevator, feeding conveyor.

MECO Conveyor with hopper and chute for material blending.

For additional information, write today for Bulletins No. 576 & No. 577. Literature mailed promptly. For immediate action, call collect!

THE MANUFACTURERS EQUIPMENT COMPANY
218 MADEIRA AVE • DAYTON 4, OHIO • Phone BA 2-5565

Check 1525 opposite last page.

NEW LITERATURE

Arc-welding-procedures summary, concerning joining tubes of similar or dissimilar types of steel by welding, is contained on Data Card TDC-155 — Tubular Products Division, The Babcock & Wilcox Company, Beaver Falls, Pa.

Check 1526 opposite last page.

Mixer is clarified in Marion Mixer Literature — Rapids Machinery Company, 865 11th St., Marion, Iowa.

Check 1527 opposite last page.

Automatic tube expanders, for rolling 1/4 to 1 1/2" OD tubes pneumatically, are considered in Bul 64—Airetool Manufacturing Company, Springfield, Ohio.

Check 1528 opposite last page.

Urethane elastomer development is presented in a 30-page booklet. "The Development of Cast Urethane Elastomers for Ultimate Properties" — Mobay Chemical Company, 1815 Washington Rd., Pittsburgh 34, Pa.

Check 1529 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Steam traps, which handle 0 to 300 psi without adjustment, are outlined in "Literature Kit 1A"—Sarco Company, Inc., 635 Madison Ave., New York 22, N.Y.

Check 1530 opposite last page.

Centrifugal impact mills, mixers and vibrating screens are considered in Impact Mill, Mixer and Vibrating Screen Literature—Entolter, Division of Safety Industries, Inc., Box 904, New Haven, Connecticut.

Check 1531 opposite last page.

Plastic pump specifications, performance data and size ratings are incorporated in six-page Pump Design Kit—Vanton Pump & Equipment Corp., Division of Cooper Alloy Corp., Hillside, N.J.

Check 1532 opposite last page.

Pneumatic-conveying systems are depicted in 12-page bulletin, which discusses types of systems and illustrates and diagrams high- and low-density arrangements. Bul M-588—The Day Company, 852 Third Ave., N.E., Minneapolis 13, Minnesota.

Check 1533 opposite last page.

Speed Packaging—Fill Direct from Original Drum!



Graco's Fast-Flo Pump speeds packaging of fluids—moves material *direct from drum* to filling operation. Accurate meter control can deliver exact amount as required. Lightweight Fast-Flo is easily changed from drum to drum without slowing assembly line. Pump uses air only when delivering fluid. Can empty full size drum in less than three minutes!

Send for more information about the amazing Graco Fast-Flo pump that's suited for large or small packaging volume. The economical Fast-Flo can transfer, agitate and dispense. Use it for a supply pump, for mixing or spraying. It handles fluids as thin as alcohol—as thick as glue. Here's the pump that can save you money!

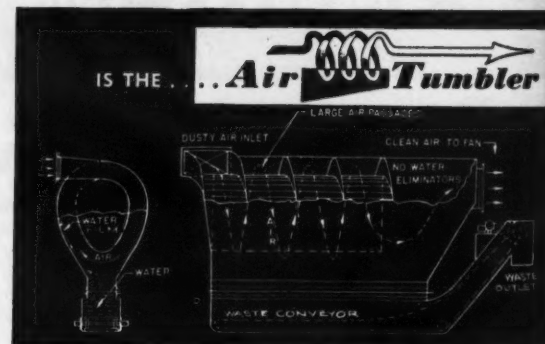


FREE IDEA BOOK
SHOWS GRACO PUMPS
FOR EVERY NEED.
SEND FOR IT TODAY!

GRACO
GRAY COMPANY, INC.
108 Graco Square
Minneapolis 13, Minnesota
(See Phone Book Yellow Pages, Spraying, for Graco Suppliers)

Check 1534 opposite last page.

The MASTER of DUST in INDUSTRY



SIMPLE—DEPENDABLE—NO FIRE HAZARD
HIGH EFFICIENCY—CONSTANT CAPACITY
LOW HUMIDIFICATION—LOW
OPERATING COST

More than one million CFM in ONE plant

Write for Bulletin No. 581. Address:

DUST SUPPRESSION & ENGINEERING CO.
P. O. BOX 67 • LAKE ORION, MICHIGAN

Check 1535 opposite last page.

CHEMICAL PROCESSING

"NETONE" Filter Paper

- HIGH TENSILE STRENGTH
- HIGH BURST FACTOR
- ABRASION RESISTANT
- CREASE RESISTANT
- CHEMICAL RESISTANT

"NETONE" Filter Paper is a neoprene impregnated kraft paper that offers decided mechanical and chemical advantages over standard filter papers.

When compared to 60-pound unbleached kraft "NETONE" Filter Paper shows a 500% increase in wet tensile strength, wet burst factor increases from 6 to 57 and there is a marked increase in abrasion and crease resistance.

The following are a few test results indicating comparative resistance factors.

Solution	60-Pound Kraft	Wet Strength Resin	Neoprene Treated (3%)
H ₂ O	0	72 hr.	86 hr.
10% HCL	0	6 min.	4 hr.
10% NaOH	0	6 hr.	72 hr.

Write us about your requirements and we will be glad to send samples for your testing.

And for your filter cloth requirements we weave fabrics of treated Cotton, VINCEL†, SARAN, DYNEL, GLASS, DACRON††, TEFLON*** POLYETHYLENE, NYLON, ORLON* AND POLYMAX†, Samples sent on request.

* TM for duPont Acrylic Fiber
*** TM for duPont Tetrafluorethylene Fiber

† TM-NFM Reg. U. S. Pat. Off.
†† TM for duPont Polyester Fiber



Weavers of Industrial Filter Media for over Fifty Years

NATIONAL FILTER MEDIA Corporation

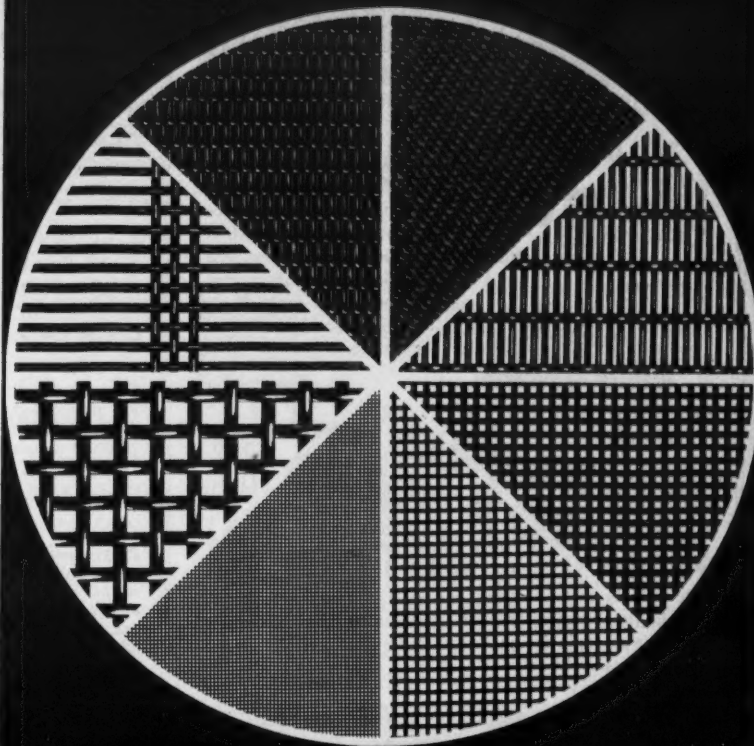
General Offices and Mills: New Haven 14, Conn.
Western Office and Factory: Salt Lake City 10, Utah

Hudson, Ohio: 227 Hartford Drive
Alhambra, Calif.: 20 South First Street
Chicago, Ill.: 6034 N. Cicero Ave.
Elizabethton, Tenn.: Paul Chapman Assoc., Box 787
Toronto: Lee Benner Chem., C. P. R. Roadway, 1119 Yonge Street

Mexico City: Maquinaria Minera, Apartado Postal #215
Cincinnati, Ohio: Roselawn Center Bldg.
Houston, Texas: 1607 Jefferson Ave.
Pensacola, Fla.: Chem-Quip Co., 1102 Texar Drive
Montreal: Lee Benner Chem., 4700 Prince of Wales

Check 1536 opposite last page.

Best industrial wire cloth and screen you can buy!



Ludlow-Saylor and STAR

Filtering, straining, sizing . . . whatever your operation, whatever problems it involves—corrosion, high pressure, vibration, heat, abrasion—there is a Ludlow-Saylor or Star wire cloth or screen to help produce a better, more uniform product with less trouble at lower cost.

Immediate shipment from stock on most weaves and sizes—or if your requirements are special, we can weave it promptly to specifications.



L-S and Star Cloth and Screens are woven from any steel including high-carbon, oil-tempered, stainless and other alloys; Monel, bronze, copper, brass or any metal that can be drawn into wire.

Write for Condensed Screen Reference Catalog

LUDLOW-SAYLOR WIRE CLOTH CO.
614 S. Newstead Ave. • St. Louis 10, Mo.
Birmingham 1727 Sixth Ave. No. Pittsburgh Union Trust Bldg.
Chicago 6261 W. Grand Ave. Houston 5638 Harvey Wilson Dr.
STAR WIRE SCREEN & IRON WORKS
2515 San Fernando Road • Los Angeles 65, Calif.

Check 1537 opposite last page.

PALMER-SHILE

Materials HANDLING EQUIPMENT


Engineered and Built
to meet your needs

LIFTS OPEN and CLOSED DRUMS

Vertical DRUM LIFTER

Save valuable plant space with this improved Vertical Drum Lifter. Handled either by crane or hoist, and used where ceilings are high or low. Sure-hold safety-grip is one of its important features. All steel welded construction.

Item C-1258
\$54.75




PICKS UP BARREL, BOX OR CONTAINER

BARREL and BOX GRAB

Item NS-288 (2000 lb. capacity)
\$79.60

From 40" diameter to small nail keg. Available in 1000 and 2000 lb. capacity. Toggle principle design. Rugged construction of welded steel chain with tongs of heavy bar stock. Weight app. 35 lbs.

Item NS-288-L
\$69.50



BARRELS WEIGHING UP TO 1000 LBS. HANDLED WITH EASE BY A

BARREL TRUCK

loads automatically

Loads from a row as easily as when barrel stands alone. Only 24" wide, permitting passage thru doors or down aisles too narrow for many trucks. All welded steel construction. Weight app. 85 lbs.

Item S-911-M **\$48.30** (metal wheels)
Item S-911-R **\$54.65** (rubber wheels)
Item S-911-P **\$69.75** (pneumatic rubber wheels)



DESIGNED AND MANUFACTURED BY

Palmer Shile Co.
16016 FULLERTON AVE. DETROIT 27, MICH.

Offices in Principal Cities
EXPORT DIVISION
75 West Street, New York 6, N. Y.

Check 1538 opposite last page.

NEW LITERATURE

Molds for plastics and die-casting industries are pictured in four-page Molds Brochure — Liberty Tool & Machine Company, 18 S. 20th St., Irvington 11, N. J.

Check 1539 opposite last page.

Trolley conveyors are described and case histories of installations given in 16-page Cat CD-B—Conveyor Div., The American Mono-Rail Co., Tipp City, Ohio.

Check 1540 opposite last page.

Diaphragm control valves are specified in Bul CV53—Kieley & Mueller, Incorporated, 64 Genung St., Middletown, N. Y.

Check 1541 opposite last page.

Ceramic-fiber insulating materials are delineated in 14 ceramic-fiber Tech Data Sheets — The Carborundum Company, Niagara Falls, New York.

Check 1542 opposite last page.

Polyglycols are discussed in 24-page bulletin which includes descriptive and use information for 40 of these compounds, plus manufacturing methods and handling precautions. "Choosing the Right Polyglycol" — Technical Service and Development, The Dow Chemical Company, Midland, Mich.

Check 1543 opposite last page.

Progressing-cavity pumps, which each have only one moving part, are covered in Bul 30 CP—Robbins & Myers, Inc., Springfield, Ohio.

Check 1544 opposite last page.

Electro-slag welding equipment is subject of four-page Electro-slag Welding Bul—Arcos Corporation, 1500 S. 50th St., Philadelphia, Pa.

Check 1545 opposite last page.

Bin-level controls, which will start or stop flow of materials automatically, are presented in Bul 11-0—Standard Products Division, Stephens-Adamson Mfg. Co., 11 Ridgeway Ave., Aurora, Ill.

Check 1546 opposite last page.

Variable-speed drives are described in eight-page Bul 195 — Sterling Electric Motors, Inc., 5401 Telegraph Rd., Los Angeles 22, Calif.

Check 1547 opposite last page.

Teflon-lined pipe and fittings are pictured in four-page Fluoroflex-T Pipe Bul—Resistoflex Corporation, Roseland, N.J.

Check 1548 opposite last page.



VAN-AIR DRYER (above) DRIES and CLEANS COMPRESSED AIR at rate of 6000-cfm—sufficient for ENTIRE PLANT. 28 other sizes of VAN-AIR Dryers COVER COMPLETE RANGE OF PNEUMATIC OPERATIONS down to 1-cfm.

COMPRESSED AIR DRYERS FOR ALL PLANT OPERATIONS

Equipped with exclusive triple-desiccating chamber, VAN-AIR Dryers extract all water from compressed air—remove foreign particles and gaseous oils—destroy bacteria—reduce moisture below zero F dewpoint—operate WITHOUT heat, power, regeneration, injection or volume loss—perform continuously and automatically at the exceptionally low cost of

LESS THAN 1/16-CENT PER 1000 CU. FT.

At this low rate—under 1% of cost to compress air (national average)—VAN-AIR Dryers prevent freezing, corrosion, contamination, dilution—protect air lines, controls, tools, processes, instruments, chemicals, foods, drugs, spraying, blasting, finishing, packaging, etc. Can be installed outdoors. Will not freeze.



PLANT ENGINEERS—Look into the DOLLAR value and PENNY maintenance of Van-conditioned dry air—clean, pure, sterile. Ask for brochure with charts.

VAN PRODUCTS CO. ★ Engineers ★ Manufacturers

5727 SWANVILLE ROAD, ERIE, PENNSYLVANIA

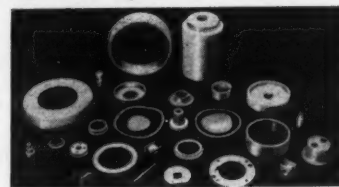
Check 1549 opposite last page.

MOLDED • MACHINED • EXTRUDED PARTS OF

TEFLON • KEL-F • NYLON

to Customer's Order and Specifications:

Fluorulon is noted for its experimentation, design and fabrication services to the Electronic, Chemical, and Electrical Industries. No quantity too large — none too small.



- PERSONAL SERVICE
- PROMPT DELIVERY
- MINIMUM COST

Make It Your Business to Call First on . . .

FLUORULON

Laboratories, Inc.

BOX 305

CApital 6-8228

CALDWELL, N. J.

Check 1550 opposite last page.

CHEMICAL PROCESSING

NEW ROTO-GUARD[®] SHAFT MOTION INDICATOR

Connects to
rotating shaft



Actuates warning
lights or other signals.
Operates
control switches.

PROVIDES positive indication of drop in speed or stopping of machinery

PROTECTS conveyors • elevators • feeders • belt conveyors
OPERATING SPEEDS of 10 to 150 rpm make the ROTO-GUARD
applicable to automatic protection of slow-moving machinery
used in material handling and similar systems

RUGGED AND COMPACT: approx. 5" x 6" x 6".

SIMPLE • POSITIVE • RELIABLE • LOW COST

A Development of

THE BIN-DICATOR COMPANY

13946-D Kercheval • Detroit 15, Michigan

Specialists in Automatic Control Devices for
Material Handling Systems for Over 20 Years

*TRADE MARK

Write
for
Bulletin
RG-16

WE SELL DIRECT • PHONE ORDERS COLLECT

Check 1551 opposite last page.

DRUMS . . . Pick Up, Move, Stack, Dump — Easier, Faster



with
New

Weld-Bilt HY-BOY Verti-Lift Portable Drum Elevator

Weld-Bilt
PRODUCTS

Great time-savers, at new low cost, HY-BOY "Verti-Lifts" load, unload, store, stack drums in less time and effort. More important—they provide fast, safe front or side tilting mechanism for efficient "last-drop" emptying. Electro-Hydraulically operated, with heavy duty battery, built-in charger, capacity, 1500 lbs., available in models for lifts from 60" to 112".

Write for HY-BOY
Catalog CM-558 and
prices on new Drum
Handling HY-BOY
Verti-Lift Portable
Elevators.

WEST BEND EQUIPMENT CORP.
MATERIALS HANDLING ENGINEERS

322 Water Street, West Bend, Wisconsin

Check 1552 opposite last page.

NEW LITERATURE

Worm gear sets' selection data is presented in 24-page catalog, fully illustrated with explanatory drawings, and containing basic information on worm gearing. Cat 3800 — De Laval Steam Turbine Company, Trenton 2, N. J.

Check 1553 opposite last page.

Dust filter, which has roller-cleaner for automatic self-cleaning, is explained in 36-page Cat 104—The W. W. Sly Manufacturing Co., 4754 Train Ave., Cleveland 1, Ohio.

Check 1554 opposite last page.

Adjustable-speed and drive-control problems are treated in eight-page Bul K-250 — Speed Variator Division, The Cleveland Worm & Gear Company, 3300 East 80th St., Cleveland 4, Ohio.

Check 1555 opposite last page.

Tube and shell heat exchangers are reviewed in Bul 448—Falls Industries, Inc., Aurora Rd., Solon, Ohio.

Check 1556 opposite last page.

Organic chemicals, laboratory reagents, spectro-quality solvents and biological stains are listed in 200-page revised "Laboratory Chemical Catalog," — Matheson Coleman & Bell Div., the Matheson Company, Inc., 2909 Highland Ave., Norwood (Cincinnati 12), Ohio.

Check 1557 opposite last page.

Treatment of condensate by scavenger mixed-bed demineralizers is discussed in Pub 117 — Cochran Corporation, 17th St. below Allegheny Ave., Philadelphia 32, Pa.

Check 1558 opposite last page.

Valves, of globe and angle types, are pictured in four-page Bul L-475—The Bastian-Blessing Company, 4201 W. Peterson Ave., Chicago 46, Ill.

Check 1559 opposite last page.

Submersible-sump-pump information is contained in eight-page bulletin, including performance tables, dimension tables, installation data, and architects' specifications. Bul 5300, Section 42 — The Deming Company, Salem, Ohio.

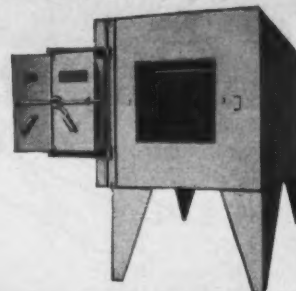
Check 1560 opposite last page.

Fluid drive applications to pipeline pumping stations for flow control are dealt with in eight-page Bul A-519 — Industrial Division, American Radiator & Standard Sanitary Corporation, Detroit 32, Mich.

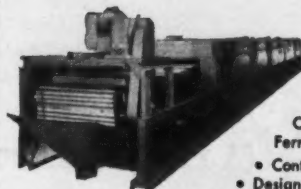
Check 1561 opposite last page.

ELECTRIC FURNACES

Uniform, Controlled Heat to 2700°



ANNEALING FURNACES specially designed for Glass and Steel applications in production and laboratory. Temperature range up to 1400°F.



CONVEYOR FURNACES for Glass Annealing, Baking Resistors, Ceramic Molding, Chemical Drying, Annealing Ferrous and Non-Ferrous Metals.

• Controlled Heat up to 1850°F.1
• Designed and Built to Your Specifications!

WRITE FOR
BULLETIN 75-TC.

TRENT INC.

Electrically Heated Industrial Equipment
235 LEVERINGTON AVE., PHILADELPHIA 27, PA.
In Canada Supreme Power Supplies Limited, Toronto 14

Check 1562 opposite last page.



Detail showing Hackney seamless chime construction.

Stainless steel chemical drums

Hackney returnable stainless steel drums provide safe, economical handling of food and chemical products. Stainless steel resists corrosion, protects contents against discoloration and contamination. Rugged strength takes handling and shipping abuses. Smooth interiors, with seamless chime construction, are always easy to clean.

55-gallon drums available in stainless, Monel, Inconel or nickel. Write for details.



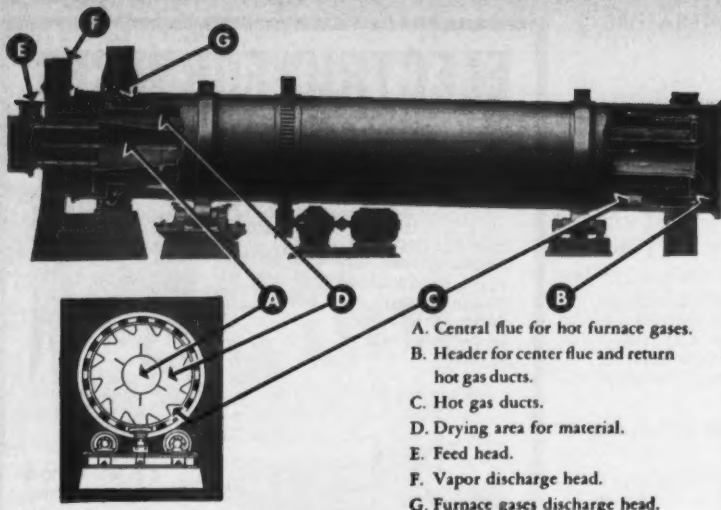
Pressed Steel Tank Company

Manufacturer of Hackney Products

1463 South 66th Street, Milwaukee 14, Wisconsin
Branch offices in principal cities

CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS

Check 1563 opposite last page.



Ruggles-Coles INDIRECT-FIRED DRYERS and HEATERS

- Dry without contamination from combustion gases, regardless of fuel.
- Minimize auxiliary dust collection when handling fine precipitates and filter cake.
- Heat pulverized materials for process work.
- Collect vapors at high concentration.
- Available fabricated with heat and corrosion-resistant metals.

104" diameter by 65' long Ruggles-Coles Indirect Dryer removing moisture from washed and filtered Kaolin clay at Gardner, Ga., plant of Mineral and Chemical Corporation of America, Edgar Division.



Write for complete specifications. Ask for Bulletin AH-438-13

HARDINGE

COMPANY, INCORPORATED

YORK, PENNSYLVANIA • 240 ARCH ST. • Main Office and Works
New York • Toronto • Chicago • Hibbing • Houston • Salt Lake City • San Francisco • Birmingham • Jacksonville Beach

Check 1564 opposite last page.

NEW LITERATURE

Geared flexible couplings, which have torque-transmitting parts machined from cold-rolled steel, are considered in Folder 2875—Link-Belt Company, Prudential Plaza, Chicago 1, Ill.

Check 1565 opposite last page.

Filter pumps of various types are depicted in eight-page bulletin which incorporates a filter-pump selection guide. Bul M-1—Sethco Manufacturing Corp., 2284 Babylon Turnpike, Merrick, N.Y.

Check 1566 opposite last page.

Gate and globe valves are clarified in Gate and Globe Valve Literature—Dept. 24A-FCP, Henry Vogt Machine Company, 1050 W. Ormsby St., Louisville 10, Ky.

Check 1567 opposite last page.

Industrial-limit-switch applications are illustrated by means of right and wrong sketches in 12-page Industrial Limit Switch Pamphlet—Micro Switch, Division of Minneapolis-Honeywell Regulator Co., Freeport, Ill.

Check 1568 opposite last page.

Motor reducers, of horsepower range to 75 hp and in standard output speeds of 1.2 to 780 rpm, are delineated in Bul 3100—The Falk Corporation, 3027 W. Canal St., Milwaukee 1, Wis.

Check 1569 opposite last page.

Organolithium compounds' use in organic synthesis is reported in annotated bibliography supplement containing 328 papers published or made available in 1958. Supplement No. 6 is available at \$2 from Lithium Corporation of America, Inc., 1100 Title Insurance Bldg., Minneapolis 1, Minn.



"We think it's had a mental breakdown over these formula changes—."



*Have you
changed
your
address
recently?*

● If so, you'll want to insure that your copy of **CHEMICAL PROCESSING** reaches you without interruption. Just send us your new address . . . use the handy form below.

Please answer all questions in regard to your new affiliation, and in addition give us your former address including company, city and state.

**mail this request to
READER SERVICE DEPT.
CHEMICAL PROCESSING**

111 East Delaware Place
Chicago 11, Illinois

Former Company Affiliation

Former Address

Your Name Present Title

Present Company

Main Product

Rating of Company

Street Address

City Zone No. State



CHEMICAL PROCESSING

for uniform results

in... **BAKING
DRYING
CURING
DEHYDRATING**

select

**YOUNG BROTHERS
OVENS and DRYERS**

designed and built
for individual product
and process requirements

Batch and Conveyor Types up to 1000° F
Gas, Electric, Steam, Oil — Radio Frequency Power

Write for Bulletin 157

YOUNG BROTHERS CO.

1825 Columbus Road • Cleveland 13, Ohio
Over 60 years of service

Check 1570 opposite last page.

NEW LITERATURE

Synchronous motor of permanent-magnet-type, is specified in 12-page Bul SS459 — Dept. SS, The Superior Electric Company, Bristol, Conn.

Check 1572 opposite last page.

Floodlight selection and description of various types are incorporated in 184-page pocket-size Bul 2714 — Crouse-Hinds Company, Syracuse 1, N. Y.

Check 1573 opposite last page.

High-pressure-gage information is included in Gage Cat—Strahman Valves, Inc., Nicolet Ave., Flushing Park, N. J.

Check 1574 opposite last page.

Adjustable-speed-drive equipment for calendars is reviewed in eight-page Bul GEA-6910 — Direct Current Motor and Generator Department, General Electric Company, Erie, Pa.

Check 1575 opposite last page.

Dry processing equipment is illustrated and described in eight-page catalog. Included are such machines as air separators, blenders, mixers, crushers, and fluid energy grinding mills. Dry processing equipment catalog — Sturtevant Mill Company, Park and Clayton Sts., Boston 22, Mass.

Check 1576 opposite last page.

Rotary airlock feeders for dust control and pneumatic conveying are reviewed in Bul P58—Prater Pulverizer Company, 1513 S. 55th Ct., Chicago 50, Ill.

Check 1577 opposite last page.

Selection of boilers is topic of 20-page dissertation on various factors involved in such decisions. "How To Select A Boiler"—Cleaver-Brooks Company, 493 E. Keefe Ave., Milwaukee 12, Wis.

Check 1578 opposite last page.

Check valves are treated in Bul 654—The Williams Gauge Co., Inc., 2 Gateway Center, Pittsburgh 22, Pa.

Check 1579 opposite last page.

Battery-electric industrial trucks are described and major features of construction and operating characteristics illustrated in 18-page booklet. Comments from users are given. "Why We Use Battery-Electric Industrial Trucks" may be obtained (up to three copies without cost) by writing on company letterhead to Electric Industrial Truck and Allied Products Manufacturers, Suite 758, One Gateway Center, Pittsburgh 22, Pa.



Drive out
FOUL AIR
Blow in
FRESH AIR
with *Coppus Type A Ventilator*

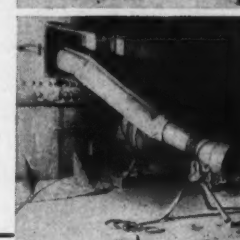
Assure greater safety, comfort for workers... get greater efficiency.

Drive out dangerous fumes, gases, stagnant or hot air from boilers, cable manholes, tanks, vats and other confined places. Supply fresh air continuously.

Send now for further information. Coppus Engineering Corporation, 390 Park Avenue, Worcester 2, Mass.

MANHOLES made safe for workers' entrance within minutes.

BOILER AND TANK INTERIORS cooled by Coppus. Fresh air supplied continuously.

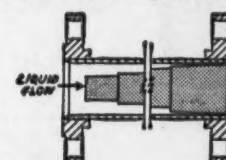


Check 1580 opposite last page.

NEW PIPING STRAINERS

Simplify removal of objectionable dirt from any piping system

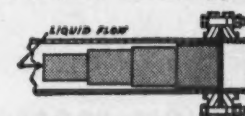
Elimination of objectionable dirt particles and other foreign matter from air, gas or liquid streams is accomplished effectively with Air-Maze Piping Strainers.



Installation of Air-Maze Piping Strainer in pipe strainer body.

For economy of installation, these strainers are mounted directly into any line using conventional Schedule 40 S pipe and Series 15 flanges. Cylindrical in design, the metal media

has multiple steps to provide maximum filtration area. Media in opening sizes .0013" to .0307" can be supplied. Maximum operating temperature 250°F. Maximum pressure drop 50 psi.



Installation of Air-Maze Piping Strainer in flange pipe.

Furnished with pipe strainer bodies, where required for nominal pipe sizes from 2" to 24".

Write Air-Maze Corporation, Department CP-10, Cleveland 28, Ohio. (Subsidiary of ROCKWELL-STANDARD Corporation)

Check 1581 opposite last page.



put your production
IN SAFE HANDS
with *SURETY*
SURESEAL GLOVES

SURESEAL MOST SPECIFIED WHERE

- ✓ the handling of acids and other corrosive materials demand maximum hand protection.
- ✓ production requirements prescribe fast, sure handling of caustic liquids.
- ✓ positive protection against crippling and disfiguring accidents is a necessity.
- ✓ longer glove life is needed.

Surety Suresal Gloves, (made from Hycar) give positive protection against the greatest number of acids and other corrosive liquids and wear up to 14 times longer than competitive materials. They are more snag, abrasion and puncture-proof and the exclusive Surety Turn-Cuff gives added protection for arms and prevents liquid from getting into the glove.

Tell us your requirements and test a pair today — at our expense. Write on your letterhead naming your glove jobber and you will receive a pair by return mail.

THE **SURETY** RUBBER CO.
CARROLLTON, OHIO

IN CANADA: Safety Supply Co., Toronto

Check 1571 opposite last page.

CLASSIFIED SECTION

CHEMICAL PROCESSING

FIRST CLASS EQUIPMENT FROM YOUR FIRST SOURCE

Type 316 Stainless Reactors 1000, 2000 and 3000 gal.

Blaw Knox Conical Blender 300 cu. ft. 9'6" diameter

Plaudler Glass Lined Reactors all sizes up to 1000 gal.

Bowen S/S 4' Spray Dryer

New Unused F-B Rubber or Plastic Mills: 14" x 30"

Porc. Lined Pebble Mills 36" x 42" to 8' x 8'; others

Simpson Muller Type Batch Mixers from Lab. Ss. to 6'

Baker Perkins Dbl. Arm Jktd. Mixers to 300 gal.

Baker Perkins KO-Kneaders Continuous Type K 300 gal.

FIRST MACHINERY CORP.

209-289 Tenth St. Bklyn. 15, N. Y.

4-
16-
8-
1-

300 Gal. Baker Perkins 2-arm Mixers 30 H.P. Individual drives and 3 H.P. Hydraulic Tilts.

1020 Gal. Baker Perkins Hor. Tumbler Mixing Tanks, Jacketed, 5 H.P. Gear-motor Drives, Teflon Lined.

1500 Gal. Rd. Clo. Vert. Jacketed Agitator Mixing Tanks 75# Jacket Press. 5 H.P. Phillie Vert. Motoreducer Drives.

Heat Exchanger, 2,600,000 BTU/H., 6" Suct. & disc. with 2-10 H.P. Motors & 2-4" X 3" Cent. Pumps. New 1957.

Location: Clinton, Iowa.

Also: Storage & Pressure Tanks, Motors, Pumps, Blowers, Scales, Flakers, Selas Furnace, Struthers Wells Reactor Kettle, Vogt Chiller, Dorr Oliver Filter, Denver Thickener, Stainless Jacketed Mixing Tanks, available at Phila. Pa.

JOSEPH ROSENTHAL'S SONS, INC.

1843 N. Second Street, Phila. 22, Pa.
REgent 9-2816.

BEST BUY

SHARPLES SUPER-D-HYDRATOR

In our S. F. Showroom
Model C-27 type 316 S. S. constr. vapor-tite, Expl proof fitted. Timers, Solenoid Valves, Diversion Valve, 40 HP Expl proof Motor. USED ONLY 4 HOURS.
Cost New \$39,750.00 Our Price \$19,750.00

Wire or phone collect—GA 1-1380

ME MACHINERY AND
EQUIPMENT CO.

123 Townsend St., San Francisco 7, Calif.

*a new service
of
CHEMICAL PROCESSING
magazine*

RATES

Professional and Technical Services — Uniform card-style 2 1/4" x 7/8" only: yearly rate, per insertion: 12x — \$22.75; 6x — \$24.00; less than 6x — \$25.50.

Equipment and Materials — Display-style only . . . in multiples of a column inch 2 1/4" x 7/8" . . . maximum 7" x 10". Yearly rate, per inch: over 360" — \$22.75; 180" — \$24.00; 90" — \$25.00; under 90" — \$25.50.

Employment and Opportunities — Standard units 1 page, 2/3 page, 1/3 page available. Standard rates apply. Units smaller than 1/3 page available in multiples of a column inch 2 1/4" x 7/8". Flat rate \$35.00 per inch. Word-after-word-style available; rate is \$3.00 per line; 5 words per line; 5 lines minimum; P.O. Box available, counts as 1 line.

Closing Date — 1st of month preceding issue date.

NEW LITERATURE

Chain drives (59126) and chain conveyors and elevators (59127) are specified in two pocket-size bulletins, incorporating information on installation, operation, and maintenance. Buls 59126 and 59127 — Chain Belt Company, 4644 W. Greenfield Ave., Milwaukee 1, Wis.

Check 1582 opposite last page.

Metering pumps, which have hydraulically sealed O-rings in ground-lapped housing faces, are clarified in Gearchem Cat—Eco Engineering Company, 12 New York Ave., Newark, N.J.

Check 1583 opposite last page.

Molded cups, for pump pistons, hydraulic service, and pneumatic equipment, are presented in six-page brochure, which incorporates tables of specifications and drawings. Bul AD-145 — The Garlock Packing Company, 436 Main St., Palmyra, N. Y.

Check 1584 opposite last page.

Ventilator, for driving out germs, gases and stagnant or hot air from boilers, tanks and other confined places, is presented in Type-A Ventilator Literature—Coppus Engineering Corporation, 390 Park Ave., Worcester 2, Mass.

Check 1585 opposite last page.

Styrene copolymer, a chemically neutral, high-molecular weight resin soluble in such compounds as toluol, xylol, MEK, MIBK, and others is described in a single-page technical bulletin. Bul P-12-91-1-5-59 — Harwick Standard Chemical Company, 60 South Seiberling St., Akron 5, Ohio.

Check 1586 opposite last page.

Pneumatic handling systems for production of adhesives is described in four-page bulletin. Included is a schematic diagram outlining basic information needed to design a system. Bul I-49—Sprout, Waldron & Co., Inc., Muncy, Pa.

Check 1587 opposite last page.

Filters are reviewed in Filter Technical Literature—Dept CP, Commercial Filters Corporation, Melrose 76, Mass.

Check 1588 opposite last page.

Water testing equipment, and reagents for fast on-the-spot use, are expanded upon in 12-page bulletin containing sections on colorimetric test units, conductivity meters for measuring solids, and other types of equipment. Bul HSP-909 — Hagan Chemicals & Controls, Inc., Box 1346, Pittsburgh 30, Pa.

Check 1589 opposite last page.

Ball valve, incorporating straight-through design, is among those covered in Valve Cat—Hydromatics, Inc., Livingston, N. J.

Check 1590 opposite last page.

Use of welding carbon products, rods, plates, and paste, is clarified in 16-page "Welding Carbon Products Manual" — The Arcair Company, Box 431, Lancaster, Ohio.

Check 1591 opposite last page.

Fatty acids and their applications in industry are the subject of a 26-page catalog. Included are specifications on stearic and oleic acids; tallow fatty acids and glycerides; coconut and other vegetable fatty acids; and glycerine. Cat GRO-668—A. Gross & Company, 295 Madison Ave., New York 17, N.Y.

Check 1592 opposite last page.

New fire-safety standard for solvent-extraction plants, has just been published in pamphlet form. NFPA No. 36 is available at \$0.50 per copy from National Fire Protection Association, 60 Battery-march St., Boston 10, Mass.

O-Ring selection is considered in booklet which outlines physical and mechanical considerations in such decisions. "Auburn O-Rings" — The Auburn Manufacturing Co., Middletown, Conn.

Check 1593 opposite last page.

Power lubrication systems, for various types of trucks and industrial machinery, are clarified in a catalog, including illustrations and specifications pertaining to air, vacuum- and manually operated systems. Cat 50 — Lincoln Engineering Company, Division of The McNeil Machine & Engineering Co., 4010 Goodfellow Blvd., St. Louis 20, Mo.

Check 1594 opposite last page.

Titanium fasteners of various types are delineated in 12-page catalog, which also discusses production facilities involved. Hi Ti Titanium Cat — Standard Pressed Steel Co., Jenkintown, Pa.

Check 1595 opposite last page.

Crucibles of tungsten and molybdenum are presented in four-page Brochure KTM-9 — Kulite Tungsten Co., 1040 Hoyt Ave., Ridgefield, N. J.

Check 1596 opposite last page.

Dust collectors are subject of Bul 581—Dust Suppression & Engineering Co., Box 67, Lake Orion, Michigan.

Check 1597 opposite last page.

ADVERTISERS

in this issue

A

Abbé Engineering Company	207
Air-Maze Corporation	205
Airetool Manufacturing Company	20
Airslide and Dry-Flo Car Division, General American Transportation Corporation	14, 43
Allen-Bradley Co.	125
Allen-Sherman-Hoff Company, The	76
Allied Chemical Corp., Baker & Adam- son, General Chemical Division 2nd Cover	
Allied Chemical Corporation, National Aniline Division	70
Allied Chemical Corp., Nitrogen Divi- sion	57
Allied Metal Hose Company	115
Allis-Chalmers	143
Amercoat Corporation	4th Cover
American Brass Company, The	175
American Hard Rubber Company, Divi- sion of Amerace Corporation	20
American Machine and Metals, Inc., DeBothezat Fans Division	173
American Machine and Metals, Inc., Filtration Engineers Division	149
American Machine and Metals, Inc., Niagara Filters Division	172
American Machine and Metals, Inc., Tolhurst Centrifugals Division	176
American Meter Company, Incorporated Pump Division	122
American Steel & Wire Division, United States Steel Corporation	22, 121
American Well Works	159
Ampco Metal, Inc.	112
Armstrong Machine Works	177

B

Babcock & Wilcox Company, The, Tu- bular Products Division	50
Bailey Meter Company, Chemical and Petroleum Division	85
Baker & Adamson, General Chemical Division, Allied Chemical Corpora- tion	2nd Cover
Baldwin-Lima-Hamilton, Electronics & Instrumentation Division	40, 99
Barber-Colman Company, Wheelco Instruments Division	87
Barnstead Still & Sterilizer Co.	49
Bauer Bros. Co., The	54
Becco Chemical Division, Food Ma- chinery and Chemical Corporation	61
Belmont Packing and Rubber Company, The	107
Bin-Dicator Company, The	203
Bird Machine Company	7
Bixby-Zimmer Engineering Co.	160
Black, Sivalls & Bryson, Inc., Safety Head Division	114
Blackmer Pump Company	182
Blaw-Knox Company, Power Piping Division	154
Branson Instruments, Inc.	163
Bristol Company, The	91
Brooks Rotameter Company	58
Buffalo Forge Company, Buffalo Pumps Division	153
Buffalo Meter Company, Incorporated	97

C

Cambridge Wire Cloth Co., The	142
Cardox Division of Chemetron Corpo- ration	58

Castle Company, Wilmot	179
Catalin Corporation of America	45
Ceilcote Company, Inc., The	110
Celanese Corporation of America, Chemical Division	66-67
Chemical and Industrial Corp., The	38B-C
Chemical & Power Products, Inc.	110
Chemineer, Inc.	40
Chempump Division of Fostoria Corpo- ration	105
Chicago Pneumatic	16-17
Chiksan Company, A Subsidiary of Food Machinery and Chemical Cor- poration	35
Circle Seal Products Company, Inc.	182
Cleveland Vibrator Company, The	18
Cleveland Wire Cloth & Mfg. Co., The	88
Coddington Mfg. Co., E. D.	168
Columbia-Geneva Steel Division, United States Steel Corporation	22, 121
Commercial Filters Corporation	146
Commercial Solvents Corporation	63
Conax Corporation	193
Connecticut Hard Rubber	184
Conoflow Corporation	37
Consolidated Electrodynamics	99
Continental Can Company	128
Coppus Engineering Corporation	205
Crane Co.	47, 48
Crawford Fitting Company	161
Curtiss-Wright Corporation, Metals Processing Division	180

D

Damascus Tube Company	113
Darling Valve & Manufacturing Co.	197
Dawe's Laboratories, Inc.	62
Day Company, The	196
Day Co., The J. H.	56
DeBothezat Fans Division, American Machine and Metals, Inc.	173
Deming Co., The	157
Dempster Brothers	139
Dodge Manufacturing Corporation	136-137
Dorr-Oliver, Incorporated	160
Dow Corning Corporation	52
Dracco Division of Fuller Co.	3
Ducon Company, Inc., The	166
Dust Suppression & Engineering Co.	200
Dustex Corporation	18

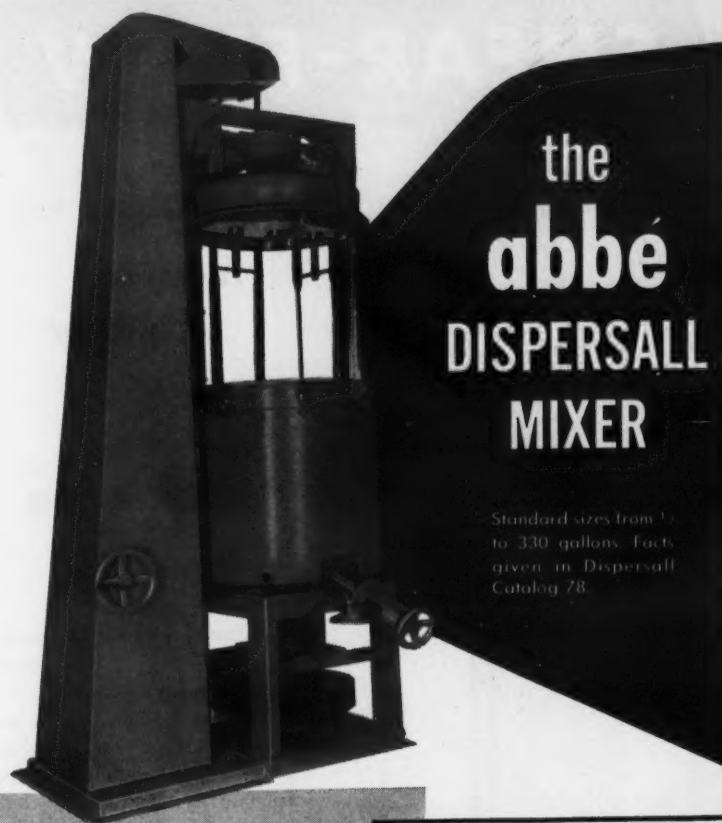
E

Eastern Industries, Incorporated	152
Eco Engineering Company	51
Eimco Corporation, The, Process En- gineers, Inc., Div.	41
Entoliter Division of Safety Industries, Inc.	18
Eriez Mfg. Co.	158
Essex Conveyors, Inc.	19
Exact Weight Scale Co., The	130
27th Exposition of Chemical Indus- tries	14A-B

F

Falk Corporation, The	185
Falls Industries, Inc.	82

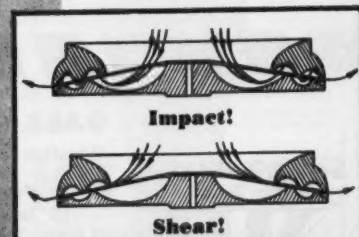
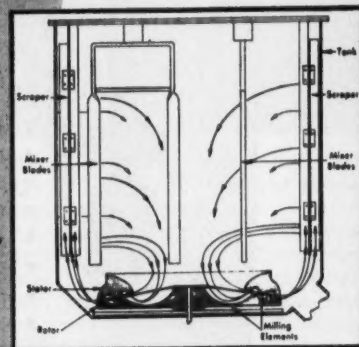
LIQUIDS, SLURRIES, PASTES



Standard sizes from 1/2
to 330 gallons. Facts
given in Dispersall
Catalog 78.

**FAST,
THOROUGH,
COMPLETE
ACTION!**

**... BLENDS
DISPERSES
EMULSIFIES
DISSOLVES
MIXES**



abbe ENGINEERING COMPANY
620 E Graybar Bldg., New York 17, N. Y.

Designers and Manufacturers of
Ball, Pebble and Jar Mills - Pulverizers - Sifters - Cutters - Mixers

Check 1598 opposite last page.

SHEAR-FLOW



the
modern
mixer
with
power
shearing

Finer, faster blending, dispersing and homogenizing is now possible with Shear-Flow's new Model RL Hi-Shear Head. Finely spaced dual impellers induce considerable shearing action and high pumping pressures that rapidly reduce particle size for superior material mixtures.

- Greatly reduces mixing time
- Uniform circulation—no vortex
- Emulsifies immiscible liquids
- Controllable flow pattern
- All parts stainless steel
- Chemically inert seals
- Handles viscous materials with ease
- No operating Torque
- Disperses, blends, homogenizes

GABB SPECIAL PRODUCTS INC.
Windsor Locks, Conn.

- ☐ Have representative call
☐ Send more information

Name _____

Position _____

Co. & Address _____



Check 1599 opposite last page.

Fansteel Metallurgical Corporation	115
Felt Products Mfg. Co.	200
Filtration Engineers, American Machine and Metals, Inc.	149
Fletcher Division of The Sharples Corporation, The	38
Flexrock Company	210
Fluorulon Laboratories, Inc.	202
Fly Ash Arrestor Corp.	54
Foremost Food and Chemical Company	65
Foxboro Company, The	92-93
Fuller Company, Subsidiary of General American Transportation Corporation 38A	

G

Gabb Special Products Inc.	208
Garlock Packing Company, The ...	108-109
Gaylord Container Corporation, Division of Crown Zellerbach Corporation	135
General American Transportation Corporation, Airslide and Dry-Flo Car Division	14, 43
General American Transportation Corporation, Turbo-Mixers, Process Equipment Division	147
Glas-Col Apparatus Co., Inc.	95
Goodall Rubber Company	164
Goodrich Chemical Company, B. F.	68
Goslin-Birmingham Manufacturing Co., Inc.	169
Gottscho	193
Goulds Pumps, Inc.	38D
Graphic Systems	192
Gray Company, Inc.	200
Great Lakes Carbon Corporation, Dicalite Department	71
Gump Co., B. F.	148

H

Hall Co., The C. P.	56
Hamer Valves, division of Chiksan Company	199
Hardinge Company, Incorporated	204
Harrisburg Steel Co., Division of Harsco Corporation	132
Harshaw Chemical Co., The	69
Hartzell Propeller Fan Co., Div. of Castle Hills Corp.	210
Haws Drinking Faucet Company	198
Hays Corporation, The	178
Hetherington & Berner Inc.	189
Highside Chemicals Incorporated	192
Hooker Chemical Corporation	59
Hough Co., The Frank G., Subsidiary-International Harvester Company	10
Howe Scale Co., The, A Subsidiary of Safety Industries, Inc.	127
Howes Co., Inc., S.	39
Hydromatics, Inc.	159

I

Illinois Testing Laboratories, Inc.	192
Illinois Water Treatment Co.	72
Imperial Brass Mfg. Co., The	193
International Paper, Bagpak Division ..	77

J

Jelliff Manufacturing Corporation, The C. O.	54
Jerguson Gage & Valve Company	168
Johns-Manville	73
Johnson Corporation, The	184
Jomac Incorporated	194
Jones & Laughlin Steel Corporation, Stainless and Strip Division	104

K

Kieley & Mueller, Incorporated	86
Kinney Engineers, Inc., S. P.	184
Kirk and Blum Manufacturing Co., The	188

L

LaBour Company, Inc., The	181
Lammert & Mann Co., Inc.	168
Lampotts Company, The	62
Lapp Insulator Co., Inc., Process Equipment Division	111
Lenape Hydraulic Pressing & Forging Co.	189
Lift Trucks, Inc.	19
Link-Belt Company	129, 148
Loneragan Co., J. E.	98
Ludlow-Saylor Wire Cloth Co.	201

M

Magnetrol, Inc.	80
Manning, Maxwell & Moore, Inc. 84,	108
Manton Gaulin Manufacturing Co., Inc.	183
Manufacturers Equipment Company, The	200
Manzel, A Unit of Houdaille Industries, Inc.	184
Marsh Instrument Company, Division of Colorado Oil and Gas Corporation	120
Meriam Instrument Company, The ...	120
Metals Disintegrating Company, Inc.	21
Milton Roy Company	94
Minnesota Mining and Manufacturing Company	190
Moisture Register Co.	152
Monarch Mfg. Works, Inc.	38
Morehouse-Cowles, Inc.	167
Munson Mill Machinery Co., A Division of Divine Brothers Company ...	218

N

Nalco Chemical Company	64
National Aniline Division, Allied Chemical Corporation	70
National Distillers and Chemical Corporation, U. S. Industrial Chemicals Co. Division	62A-B
National Filter Media Corporation, The ..	201
National Starch and Chemical Corporation	53
National Tube Division, United States Steel Corporation	22, 121
Newport News Shipbuilding and Dry Dock Company	123
Niagara Filters Division, American Machine and Metals, Inc.	172
Nitrogen Division, Allied Chemical Corp.	57
Nordstrom Valve Division, Rockwell Manufacturing Company	141

O

Orbit Valve Company	166
Oxy-Catalyst, Inc.	192

P

Palmer-Shile Co.	282
Pawtucket Manufacturing Company ...	178
Peabody Engineering Corporation	46
Penberthy Manufacturing Company, Division of Buffalo-Eclipse Corporation ..	89
Pennsalt Chemicals Corporation	164
Pennsylvania Pump and Compressor Co.	190
Perfecting Service Company	170
Pipe Fabrication Institute, The	155
Pittsburgh Coke & Chemical Co., Protective Coatings Division	182
Pittsburgh Corning Corporation	186
Pittsburgh Lector dryer Division, McGraw-Edison Company	88
Potts Company, Horace A., Speedline Stainless Steel Fittings Division	5
Power-Curve Conveyor Company	42
Prater Pulverizer Company	19
Pressed Steel Tank Company	285
Pressure Products Co., Inc.	179
Propellair, Div. of Robbins & Myers, Inc.	151
Puget Sound Fabricators, Inc.	118
Pulverizing Machinery Division, Metals Disintegrating Company, Inc.	21

CHEMICAL PROCESSING

Parolator Products, Inc. 169
Putman Publishing Company 164, 204

R

Rapids Machinery Company 197
Raybestos-Manhattan, Inc., Manhattan
Rubber Division 117
Raybestos-Manhattan, Inc., Packing Division 209
Renneburg & Sons, Edw. 162
Republic Steel, Steel and Tubes Division 197
Resistoflex Corporation 103
Rheem 79
Ridge Tool Company, The 171
Robbins & Myers, Inc. 133
Rockwell Company, W. S. 114
Rockwell Manufacturing Company 197
Rockwell Manufacturing Company, Nordstrom Valve Division 141
Rohm & Haas Company 74
Ross & Son Co., Inc., Charles 170

S

Sarco Company, Inc. 195
Scott Aviation Corporation, Safety Equipment Division 163
Screw Conveyor Corporation 210
Selas Corporation of America 165
Sharples Corporation, The 145
Shriver & Company, Inc., T. 124
Sier-Bath Gear & Pump Co., Inc. 158
Sindar Corporation 58
Sly Manufacturing Co., The W. W. 72
Smith Corporation, A. O., Harvester Products 3rd Cover
Speedline Stainless Steel Fittings Division, Horace T. Potts Company 5
Sperry & Co., D. R. 15
Spraying Systems Co. 193
Sprout, Waldron & Co., Inc. 131
Stainless and Strip Division, Jones & Laughlin Steel Corporation 104
Stearns Magnetic Products, A Division Of The Indiana Steel Products Company 9
Steel and Tubes Division, Republic Steel 197
Stephens-Adamson Mfg. Co., Standard Products Division 182
Strahman Valves, Inc. 124
Struthers Wells Corporation 44
Sturtevant Mill Co. 194
Sun Shipbuilding & Dry Dock Company 8
Surety Rubber Co., The 205
Sutorbilt Corporation, Subsidiary of Fuller Company 191

T

Taber Pump Co. 128
Tamm Industries Co. 62
Taylor Instrument Companies 96

Taylor, Stiles & Company 12
Tennessee Coal & Iron Division, United States Steel Corporation 22, 121
Thermal Research & Engineering Corp. 4
Thermo Electric Co., Inc. 89
Tinker & Rasor 182
Titeflex Inc. 119
Tolhurst Centrifugals Division, American Machine and Metals, Inc. 176
Tote System, Inc. 81
Trent Inc. 203
Turbo-Mixers, General American Transportation Corporation, Process Equipment Division 147

U

Union Asbestos & Rubber Company 156
Union Carbide Chemicals Company, Division of Union Carbide Corporation 36
Union Carbide Corporation, Visking Division 134
Union Iron Works 171
U. S. Electrical Motors Inc. 174
U. S. Industrial Chemicals Co., Division of National Distillers and Chemical Corporation 62A-B
U. S. Stoneware 60
United States Steel Corporation 22, 121
United States Steel Export Company Division, United States Steel Corporation 22, 121
United States Steel Supply Division, United States Steel Corporation 22, 121

V

Van Products Co. 202
Vanton Pump & Equipment Corp., Division of Cooper Alloy Corp. 120
Vibra Screw Feeders, Inc. 148
Virginia Dept. of Conservation and Economic Development 11
Visking Company, Division of Union Carbide Corporation, Plastics Division 134
Vogt Machine Co., Henry 78
Vulcan Containers Inc. 13

W

W & W Manufacturing Company 62
Webster Manufacturing, Inc. 132
West Bend Equipment Corp. 203
Western Precipitation Corporation 150
Weston Instruments, Division of Daystrom Inc. 116
Wheeler Manufacturing Co., C. H. 188
Wiegand Company, Edwin L. 98
Wiley & Sons, Inc., John 168
Williams Gauge Co., Inc., The 124

Y

Yarnall-Waring Co. 144
Yeomans 187
Young Brothers Co. 205

Advertising Representatives

NATHANIEL BECK, JR. — Vice President

BUFFALO 15, 1931 Kensington Avenue, Windsor 7765, Raymond C. Clifford, District Manager
CHICAGO 11, 111 East Delaware Place, Whitehall 4-6141, Charles P. Gilkison, Jr., Western Sales Manager; George W. McFriedies, District Manager; Vincent F. Donohue, District Manager; Harry M. Gill
CLEVELAND 9, 5414 Archmere Avenue, SHadyside 1-9452, D. A. Facka, District Manager
LOS ANGELES 57, Granada Building, 672 So. La Fayette Park Place, DUUnkirk 8-2286, Bob Wettstein & Associates, Bob Wettstein, Jerry Holtz
NEW ENGLAND, East Shore Rd., Jamestown, R. I., Ph. Jamestown 38, Kenneth S. Kaul, Vice President
NEW YORK 17, 369 Lexington Avenue, Murray Hill 6-7738, Kenneth S. Kaul, Vice President; Norman A. Schuele, Jr., Eastern Sales Manager; Henry C. Ruppel, District Manager; Robert A. Norton, District Manager; Thomas Willson
PHILADELPHIA, 611 Topsfield Road, Hatboro, Pa., Osborne 5-5193, William J. McCaw, District Manager
PITTSBURGH 22, 544 Oliver Building, ATLantic 1-2783, Raymond C. Clifford, District Manager; D. A. Facka, District Manager
PORTLAND 5, 337 Pittcock Block, 921 S. W. Washington Street, CApiitol 8-4107, Bob Wettstein & Associates
SAN FRANCISCO 8, 355 Stockton Street, YUkon 2-9537, Bob Wettstein & Associates, Jerry Nowell, Gene R. Watts
ST. LOUIS, 515 Newport Avenue, Webster Groves, Mo., WOODland 2-4384, Donald F. Maguire, District Manager
SOUTHEASTERN STATES, 40 Peachtree Place, N. W., Atlanta 9, Ga. TRinity 2-2235, Joe H. Howell

OCTOBER 1959

Bob: We need a valve ring that won't interfere with sensitive valve adjustments. What we have now is either too tight or too loose. Ned

NED: HERE'S YOUR ANSWER—"TEFLON" VALVE RINGS BY R/M. PRECISION MACHINED FOR CLOSE FIT. NOTE THE WAXY FEEL - RINGS SLIDE ON ONE ANOTHER FOR EASY ADJUSTMENT. BOB



"Teflon" Valve Stem Packings are just what you need when you are making sensitive adjustments on slow moving rotary and reciprocating equipment. The precision machined rings slip on each other and exert pressure against the valve stem or rod. Because it does not react to any known chemical and has no known solvent, "Teflon" is ideal where corrosion is a problem. It has excellent nonadhesive properties—an added benefit if you are handling vis-

cous fluids. "Teflon" Valve Stem Packings are supplied in wedge and angular type and as solid unit rings.

R/M also manufactures a complete range of homogeneous and reinforced valve stem packings engineered to meet many other requirements: high temperatures, high pressures, high speeds, temperature extremes, etc.

Feel free to call on the experienced R/M packing engineers for details and service, whatever your packing needs.

R/M MAKES A COMPLETE LINE OF MECHANICAL PACKINGS—including Vee-Flex®, Vee-Square®, Universal Plastic, and "Versi-pak"®; GASKET MATERIALS; and "TEFLON" PRODUCTS. SEE YOUR R/M DISTRIBUTOR. *A Du Pont trademark

R/M

PACKINGS
RAYBESTOS-MANHATTAN, INC.
PACKING DIVISION, PASSAIC, N.J.
MECHANICAL PACKINGS AND GASKET MATERIALS

RAYBESTOS-MANHATTAN, INC., Mechanical Packings • Asbestos Textiles • Industrial Rubber • Engineered Plastics
Sintered Metal Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings
Brake Blocks • Clutch Facings • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

Check 1600 opposite last page.

Kewanee HYDRAULIC TRUCK DUMPERS

SAVE TIME AND MONEY UNLOADING YOUR BULK MATERIALS

Kewanee Hydraulic Truck Dumpers will unload any size truck or tractor-trailer in less than two minutes releasing vehicles for return loads in a minimum of time.

Built in a range of sizes to suit your needs, with lifting capacities up to 100,000 lbs. Scale or non-scale types. Massive construction assures dependable performance. Controls are operated by one man.



Photo shows a 50 ft. Kewanee with patented "A" frame unloading chips in a paper mill.

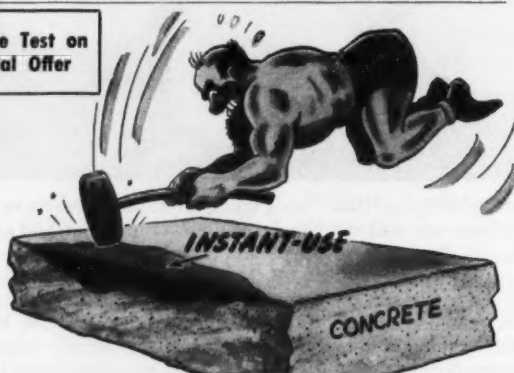
Periodic inspection service is available to users wherever located. Let us engineer a Kewanee into your layout.

Write for Brochure

Screw Conveyor Corporation
137 HOFFMAN STREET • HAMMOND, INDIANA
WINDON, MISSISSIPPI • SANTA CLARA, CALIFORNIA
TRADE MARK REG. • REG. PAT. OFFICE

Check 1601 opposite last page.

Make Test on Trial Offer



Tough, Fast Repairs!

INSTANT SETTING FLOOR PATCH

Repair broken factory floors without the usual traffic tie-up. Simply shovel INSTANT-USE into hole or rut—tamp smooth—truck over! No waiting! INSTANT-USE bonds tight to old concrete—right up to a leather edge. It's tough. Wears like iron. Won't crack or crumble. Install complete overlay where floors are badly chewed up. Used indoors or out. Immediate shipment.

Get FREE Brochure and Trial Offer!

INSTANT-USE

FLEXROCK COMPANY (Offices in principal cities)
3611 Filbert St., Philadelphia 1, Pa.

Please send me complete INSTANT-USE information, details of TRIAL ORDER PLAN and Free INSTANT-USE BROCHURE—no obligation. (Clip and attach Coupon to company letterhead).

Name
Title
Company
Address



Check 1602 opposite last page.



that's interesting

Thought-provoking slants on projects and products



Gutter gadget eases householders' chores

A new day is dawning for the harried householder who periodically must clean out the gutters.

A plastic (polyethylene resin) guard designed like a tube and split down one side sheds twigs, leaves, and even ice and snow from gutters. When installed, it is high enough above gutter edges to provide a natural slope.

As water flows over guard it enters gutter through ports formed by scalloped edges around tube's open side. Guard is easily flexed in installation, and can be cut to length with pocketknife.

Plastic 'phantom patient' aids fight on cancer

A great deal of guesswork involving how much radiation a person can tolerate in being treated for stubborn cancers of the lower intestinal tract is being eliminated through use of a plastic "phantom patient" made like a dressmaker's model.

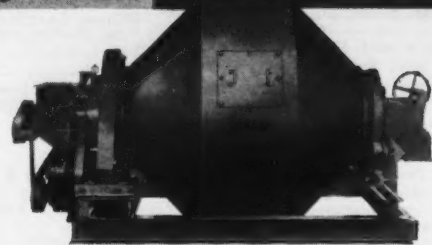
Before atom-blasting of the disease begins, a plastic model of the patient is fabricated to determine how deeply hard radiation will penetrate when applied.

Sheets of plastic are heated and molded over patient's ab-

Continued on back cover

Evenly Blended

but no reduction in particle size



THE MUNSON ROTARY BATCH MIXER blends every ingredient evenly, without stratification and without reduction of particle size. Handles any mixture of dry ingredients, with capacities ranging from 5 cu. ft. to 360 cu. ft. Intake and discharge at opposite ends make MUNSON ROTARY BATCH MIXERS ideal for automatic or semi-automatic and straight flow production. Heavy construction good for years of trouble-free service. Optional spray attachments for liquid additives up to 15%. Strip heaters also optional. Write Muson for full information.

MUNSON MILL MACHINERY CO.

A Division of Divine Brothers Company

200 Seward Ave. • Utica 1, N. Y.

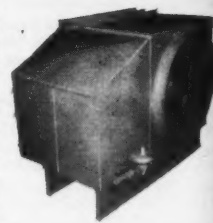
Dry Mixers • Blenders • Hammer Mills • Attrition Mills • Rotary Kolls Cutters • Steel Elevator Heads, Leggings, Boots • Electro-Matic Shovel

Check 1603 opposite last page.



Here's one way...

to insure adequate make-up air. But Hartzell intake units do the job more efficiently, and they provide precise temperature control, too. Send for Bulletin A-115.



HARTZELL PROPELLER FAN CO.
Div. of Castle Hills Corp.
65 Thomas Blvd., Piqua, Ohio A member of AMCA

Check 1604 opposite last page.

CHEMICAL PROCESSING

If you want more information on processes, materials, controls, or other developments discussed herein, as you read this issue, ask our
READER SERVICE DEPARTMENT . . . use this sheet

READER SERVICE SLIP

An Editorial Service — No Obligation

As you read editorial articles and advertisements which interest you, on which you'd like more information, note key number under each. Check that number in space provided on this sheet. Fill in your name, title, company, main product, and address on reverse side and mail to publisher's Reader Service Dept. Information will come to you direct, without obligation.

IMPORTANT:

If you check a number having an asterisk (*) after it, be sure to follow special instructions at bottom of this page.

OCTOBER 1959

Use this space for writing in specific literature or product designation when you check a number with an asterisk (*) in accompanying list. Repeat the key number from that list, and follow it with specific bulletin number (or title), or product name, as it appears in article or advertisement. PLEASE TYPE OR PRINT.

<input type="checkbox"/> 1000	<input type="checkbox"/> 1052	<input type="checkbox"/> 1104	<input type="checkbox"/> 1156	<input type="checkbox"/> 1208	<input type="checkbox"/> 1260
<input type="checkbox"/> 1001	<input type="checkbox"/> 1053	<input type="checkbox"/> 1105	<input type="checkbox"/> 1157	<input type="checkbox"/> 1209	<input type="checkbox"/> 1261
<input type="checkbox"/> 1002	<input type="checkbox"/> 1054*	<input type="checkbox"/> 1106	<input type="checkbox"/> 1158	<input type="checkbox"/> 1210	<input type="checkbox"/> 1262
<input type="checkbox"/> 1003	<input type="checkbox"/> 1055	<input type="checkbox"/> 1107	<input type="checkbox"/> 1159	<input type="checkbox"/> 1211	<input type="checkbox"/> 1263
<input type="checkbox"/> 1004	<input type="checkbox"/> 1056	<input type="checkbox"/> 1108	<input type="checkbox"/> 1160	<input type="checkbox"/> 1212	<input type="checkbox"/> 1264
<input type="checkbox"/> 1005	<input type="checkbox"/> 1057	<input type="checkbox"/> 1109	<input type="checkbox"/> 1161	<input type="checkbox"/> 1213	<input type="checkbox"/> 1265
<input type="checkbox"/> 1006	<input type="checkbox"/> 1058	<input type="checkbox"/> 1110	<input type="checkbox"/> 1162	<input type="checkbox"/> 1214	<input type="checkbox"/> 1266
<input type="checkbox"/> 1007	<input type="checkbox"/> 1059	<input type="checkbox"/> 1111	<input type="checkbox"/> 1163*	<input type="checkbox"/> 1215	<input type="checkbox"/> 1267
<input type="checkbox"/> 1008	<input type="checkbox"/> 1060	<input type="checkbox"/> 1112	<input type="checkbox"/> 1164	<input type="checkbox"/> 1216	<input type="checkbox"/> 1268
<input type="checkbox"/> 1009*	<input type="checkbox"/> 1061	<input type="checkbox"/> 1113	<input type="checkbox"/> 1165	<input type="checkbox"/> 1217	<input type="checkbox"/> 1269
<input type="checkbox"/> 1010	<input type="checkbox"/> 1062	<input type="checkbox"/> 1114	<input type="checkbox"/> 1166	<input type="checkbox"/> 1218	<input type="checkbox"/> 1270
<input type="checkbox"/> 1011	<input type="checkbox"/> 1063	<input type="checkbox"/> 1115	<input type="checkbox"/> 1167	<input type="checkbox"/> 1219*	<input type="checkbox"/> 1271
<input type="checkbox"/> 1012	<input type="checkbox"/> 1064	<input type="checkbox"/> 1116	<input type="checkbox"/> 1168	<input type="checkbox"/> 1220	<input type="checkbox"/> 1272
<input type="checkbox"/> 1013	<input type="checkbox"/> 1065	<input type="checkbox"/> 1117	<input type="checkbox"/> 1169	<input type="checkbox"/> 1221	<input type="checkbox"/> 1273
<input type="checkbox"/> 1014	<input type="checkbox"/> 1066	<input type="checkbox"/> 1118	<input type="checkbox"/> 1170	<input type="checkbox"/> 1222	<input type="checkbox"/> 1274
<input type="checkbox"/> 1015	<input type="checkbox"/> 1067	<input type="checkbox"/> 1119	<input type="checkbox"/> 1171	<input type="checkbox"/> 1223	<input type="checkbox"/> 1275
<input type="checkbox"/> 1016	<input type="checkbox"/> 1068	<input type="checkbox"/> 1120	<input type="checkbox"/> 1172	<input type="checkbox"/> 1224	<input type="checkbox"/> 1276
<input type="checkbox"/> 1017	<input type="checkbox"/> 1069	<input type="checkbox"/> 1121*	<input type="checkbox"/> 1173	<input type="checkbox"/> 1225	<input type="checkbox"/> 1277
<input type="checkbox"/> 1018	<input type="checkbox"/> 1070	<input type="checkbox"/> 1122	<input type="checkbox"/> 1174	<input type="checkbox"/> 1226	<input type="checkbox"/> 1278
<input type="checkbox"/> 1019	<input type="checkbox"/> 1071	<input type="checkbox"/> 1123	<input type="checkbox"/> 1175	<input type="checkbox"/> 1227	<input type="checkbox"/> 1279
<input type="checkbox"/> 1020	<input type="checkbox"/> 1072	<input type="checkbox"/> 1124	<input type="checkbox"/> 1176	<input type="checkbox"/> 1228	<input type="checkbox"/> 1280*
<input type="checkbox"/> 1021	<input type="checkbox"/> 1073	<input type="checkbox"/> 1125	<input type="checkbox"/> 1177	<input type="checkbox"/> 1229*	<input type="checkbox"/> 1281
<input type="checkbox"/> 1022	<input type="checkbox"/> 1074	<input type="checkbox"/> 1126*	<input type="checkbox"/> 1178	<input type="checkbox"/> 1230	<input type="checkbox"/> 1282
<input type="checkbox"/> 1023	<input type="checkbox"/> 1075	<input type="checkbox"/> 1127	<input type="checkbox"/> 1179	<input type="checkbox"/> 1231	<input type="checkbox"/> 1283
<input type="checkbox"/> 1024	<input type="checkbox"/> 1076*	<input type="checkbox"/> 1128	<input type="checkbox"/> 1180	<input type="checkbox"/> 1232	<input type="checkbox"/> 1284
<input type="checkbox"/> 1025	<input type="checkbox"/> 1077	<input type="checkbox"/> 1129	<input type="checkbox"/> 1181	<input type="checkbox"/> 1233	<input type="checkbox"/> 1285
<input type="checkbox"/> 1026*	<input type="checkbox"/> 1078	<input type="checkbox"/> 1130	<input type="checkbox"/> 1182	<input type="checkbox"/> 1234	<input type="checkbox"/> 1286
<input type="checkbox"/> 1027	<input type="checkbox"/> 1079	<input type="checkbox"/> 1131	<input type="checkbox"/> 1183	<input type="checkbox"/> 1235	<input type="checkbox"/> 1287
<input type="checkbox"/> 1028	<input type="checkbox"/> 1080*	<input type="checkbox"/> 1132	<input type="checkbox"/> 1184*	<input type="checkbox"/> 1236	<input type="checkbox"/> 1288
<input type="checkbox"/> 1029	<input type="checkbox"/> 1181	<input type="checkbox"/> 1133	<input type="checkbox"/> 1185	<input type="checkbox"/> 1237*	<input type="checkbox"/> 1289
<input type="checkbox"/> 1030	<input type="checkbox"/> 1082	<input type="checkbox"/> 1134	<input type="checkbox"/> 1186	<input type="checkbox"/> 1238	<input type="checkbox"/> 1290
<input type="checkbox"/> 1031	<input type="checkbox"/> 1083	<input type="checkbox"/> 1135	<input type="checkbox"/> 1187	<input type="checkbox"/> 1239	<input type="checkbox"/> 1291
<input type="checkbox"/> 1032	<input type="checkbox"/> 1084	<input type="checkbox"/> 1136	<input type="checkbox"/> 1188	<input type="checkbox"/> 1240	<input type="checkbox"/> 1292
<input type="checkbox"/> 1033	<input type="checkbox"/> 1085	<input type="checkbox"/> 1137	<input type="checkbox"/> 1189*	<input type="checkbox"/> 1241*	<input type="checkbox"/> 1293
<input type="checkbox"/> 1034	<input type="checkbox"/> 1086	<input type="checkbox"/> 1138	<input type="checkbox"/> 1190	<input type="checkbox"/> 1242	<input type="checkbox"/> 1294
<input type="checkbox"/> 1035	<input type="checkbox"/> 1087	<input type="checkbox"/> 1139	<input type="checkbox"/> 1191	<input type="checkbox"/> 1243	<input type="checkbox"/> 1295
<input type="checkbox"/> 1036	<input type="checkbox"/> 1088	<input type="checkbox"/> 1140	<input type="checkbox"/> 1192	<input type="checkbox"/> 1244	<input type="checkbox"/> 1296*
<input type="checkbox"/> 1037	<input type="checkbox"/> 1089	<input type="checkbox"/> 1141	<input type="checkbox"/> 1193	<input type="checkbox"/> 1245	<input type="checkbox"/> 1297
<input type="checkbox"/> 1038	<input type="checkbox"/> 1090*	<input type="checkbox"/> 1142	<input type="checkbox"/> 1194	<input type="checkbox"/> 1246	<input type="checkbox"/> 1298
<input type="checkbox"/> 1039	<input type="checkbox"/> 1091	<input type="checkbox"/> 1143	<input type="checkbox"/> 1195	<input type="checkbox"/> 1247	<input type="checkbox"/> 1299
<input type="checkbox"/> 1040	<input type="checkbox"/> 1092	<input type="checkbox"/> 1144*	<input type="checkbox"/> 1196	<input type="checkbox"/> 1248	<input type="checkbox"/> 1300
<input type="checkbox"/> 1041	<input type="checkbox"/> 1093	<input type="checkbox"/> 1145	<input type="checkbox"/> 1197	<input type="checkbox"/> 1249	<input type="checkbox"/> 1301
<input type="checkbox"/> 1042*	<input type="checkbox"/> 1094	<input type="checkbox"/> 1146	<input type="checkbox"/> 1198	<input type="checkbox"/> 1250	<input type="checkbox"/> 1302
<input type="checkbox"/> 1043	<input type="checkbox"/> 1095*	<input type="checkbox"/> 1147	<input type="checkbox"/> 1199	<input type="checkbox"/> 1251	<input type="checkbox"/> 1303
<input type="checkbox"/> 1044	<input type="checkbox"/> 1096	<input type="checkbox"/> 1148	<input type="checkbox"/> 1200	<input type="checkbox"/> 1252	<input type="checkbox"/> 1304
<input type="checkbox"/> 1045	<input type="checkbox"/> 1097*	<input type="checkbox"/> 1149	<input type="checkbox"/> 1201	<input type="checkbox"/> 1253	<input type="checkbox"/> 1305
<input type="checkbox"/> 1046	<input type="checkbox"/> 1098	<input type="checkbox"/> 1150	<input type="checkbox"/> 1202	<input type="checkbox"/> 1254	<input type="checkbox"/> 1306
<input type="checkbox"/> 1047*	<input type="checkbox"/> 1099	<input type="checkbox"/> 1151	<input type="checkbox"/> 1203	<input type="checkbox"/> 1255	<input type="checkbox"/> 1307
<input type="checkbox"/> 1048	<input type="checkbox"/> 1100	<input type="checkbox"/> 1152	<input type="checkbox"/> 1204	<input type="checkbox"/> 1256	<input type="checkbox"/> 1308
<input type="checkbox"/> 1049	<input type="checkbox"/> 1101	<input type="checkbox"/> 1153	<input type="checkbox"/> 1205	<input type="checkbox"/> 1257	<input type="checkbox"/> 1309
<input type="checkbox"/> 1050	<input type="checkbox"/> 1102	<input type="checkbox"/> 1154	<input type="checkbox"/> 1206	<input type="checkbox"/> 1258	<input type="checkbox"/> 1310
<input type="checkbox"/> 1051	<input type="checkbox"/> 1103	<input type="checkbox"/> 1155	<input type="checkbox"/> 1207	<input type="checkbox"/> 1259	<input type="checkbox"/> 1311*

On all numbers having an asterisk () after them, please identify the exact product or piece of literature in one of the blank columns on this and the next page. Write in the key number, as given on the slip, followed by the bulletin number (or title), or name of product in which you are interested.

See additional numbers on reverse side

Be Sure To Give Your Address

READER SERVICE SLIP

Continued from reverse side of this sheet

OCTOBER 19

Use this space for writing in specific literature or product designation when you check a number with an asterisk (*) in accompanying list. Repeat the key number from that list, and follow it with specific bulletin number (or title), or product name, as it appears in article or advertisement. PLEASE TYPE OR PRINT.

Be Sure To Give Your Address

- | | | | | | |
|-------|-------|-------|-------|-------|-------|
| 1312 | 1362 | 1412 | 1462 | 1512 | 1562 |
| 1313 | 1363 | 1413* | 1463 | 1513 | 1563 |
| 1314 | 1364 | 1414* | 1464 | 1514 | 1564 |
| 1315 | 1365 | 1415 | 1465 | 1515 | 1565 |
| 1316 | 1366 | 1416 | 1466* | 1516 | 1566 |
| 1317 | 1367 | 1417 | 1467 | 1517 | 1567 |
| 1318 | 1368 | 1418 | 1468 | 1518 | 1568 |
| 1319 | 1369 | 1419 | 1469 | 1519 | 1569 |
| 1320* | 1370 | 1420 | 1470 | 1520 | 1570 |
| 1321 | 1371 | 1421 | 1471* | 1521* | 1571 |
| 1322 | 1372 | 1422 | 1472 | 1522 | 1572 |
| 1323 | 1373* | 1423 | 1473 | 1523 | 1573 |
| 1324 | 1374 | 1424 | 1474 | 1524 | 1574 |
| 1325 | 1375 | 1425 | 1475 | 1525 | 1575 |
| 1326 | 1376 | 1426 | 1476 | 1526 | 1576 |
| 1327 | 1377 | 1427 | 1477 | 1527 | 1577 |
| 1328 | 1378 | 1428 | 1478 | 1528 | 1578 |
| 1329* | 1379 | 1429 | 1479 | 1529 | 1579 |
| 1330 | 1380 | 1430 | 1480* | 1530 | 1580 |
| 1331 | 1381 | 1431 | 1481 | 1531* | 1581 |
| 1332 | 1382 | 1432 | 1482 | 1532 | 1582* |
| 1333 | 1383 | 1433 | 1483 | 1533 | 1583 |
| 1334 | 1384 | 1434 | 1484 | 1534 | 1584 |
| 1335 | 1385 | 1435 | 1485 | 1535 | 1585 |
| 1336 | 1386 | 1436 | 1486 | 1536 | 1586 |
| 1337 | 1387 | 1437 | 1487 | 1537 | 1587 |
| 1338 | 1388 | 1438 | 1488 | 1538 | 1588 |
| 1339 | 1389 | 1439 | 1489 | 1539 | 1589 |
| 1340 | 1390 | 1440 | 1490 | 1540 | 1590 |
| 1341 | 1391 | 1441 | 1491 | 1541 | 1591 |
| 1342* | 1392 | 1442 | 1492 | 1542 | 1592 |
| 1343 | 1393 | 1443 | 1493 | 1543 | 1593 |
| 1344 | 1394 | 1444 | 1494 | 1544 | 1594 |
| 1345 | 1395 | 1445 | 1495 | 1545 | 1595 |
| 1346 | 1396 | 1446 | 1496 | 1546 | 1596 |
| 1347 | 1397 | 1447 | 1497 | 1547 | 1597 |
| 1348 | 1398 | 1448 | 1498 | 1548 | 1598 |
| 1349 | 1399 | 1449 | 1499 | 1549 | 1599 |
| 1350 | 1400 | 1450 | 1500 | 1550 | 1600 |
| 1351 | 1401 | 1451 | 1501 | 1551 | 1601 |
| 1352 | 1402 | 1452 | 1502 | 1552 | 1602 |
| 1353 | 1403 | 1453 | 1503 | 1553 | 1603 |
| 1354 | 1404 | 1454 | 1504 | 1554 | 1604 |
| 1355 | 1405 | 1455 | 1505 | 1555 | 1605 |
| 1356 | 1406 | 1456 | 1506 | 1556 | 1606 |
| 1357 | 1407 | 1457 | 1507 | 1557 | |
| 1358 | 1408 | 1458 | 1508 | 1558 | |
| 1359 | 1409 | 1459 | 1509 | 1559 | |
| 1360 | 1410 | 1460 | 1510 | 1560 | |
| 1361 | 1411 | 1461 | 1511 | 1561 | |

On all numbers having an asterisk () after them, please identify the exact product or piece of literature in one of the blank columns on this and front page. Write in the key number, as given on the slip, followed by the bulletin number (or title), or name of product in which you are interested.

(This request form expires January 5, 1960)

Please type or print and be sure to give your title and main product of company

Name	Title
.....

Company	Main Product
----------------	---------------------

Street Address of Company

City Zone No. State

This is an Editorial Service — No Obligation

Fill in . . . mail to READER SERVICE DEPT., CHEMICAL PROCESSING
111 East Delaware Place, Chicago 11, Illinois

Special subscription request-qualification form for use of

OCTOBER 1959

**Management and technical men who wish to receive
CHEMICAL PROCESSING regularly – request below
... if you qualify, there is no charge**

If you are responsible for processing operations, in a management or technical capacity, as corporate officer, manager, technical purchasing agent, chemical engineer, chemist, engineer, or equivalent responsibility ... in a plant of substantial operations* where chemical processing is an important factor ... CHEMICAL PROCESSING will be sent to you regularly, at your request — there is no charge.

Present Reader ... if this issue of CHEMICAL PROCESSING was addressed to you or if you have previously mailed one of these request slips, it is not necessary to fill in this form.

New Reader ... if you qualify as outlined above CHEMICAL PROCESSING will be sent to you regularly. There is no charge to those who qualify. In requesting, be sure to answer all questions. If your firm is not rated or listed in standard references, indicate size of the company by capacity, annual sales or number of employees. Unless all information is given, magazine will not be sent.

Please print or type

Name Title

Company

Main Products

Rating of Company

Street Address of Company

City Zone No. State

Others in Your Plant ... if others in your plant, having responsibilities for processing operations as outlined above, would also like to receive CHEMICAL PROCESSING, use the form on back of this sheet.

Change of Address ... Use this form to notify us of a change in address. Please answer all questions in regard to your new affiliation, and in addition give us your former address including company, city and state.

Please print or type

Former Company Affiliation

Former Address

Your Name Present Title

Present Company

Main Products

Rating of Company

Street Address of Company

City Zone No. State

* "substantial operations" does not necessarily mean an extremely large plant. But requests for the magazine exceed supply so we must set standards to insure publication being sent where it can be used to best advantage.

**Just mail this request to
READER SERVICE DEPT., CHEMICAL PROCESSING
111 East Delaware Place, Chicago 11, Illinois**

See other side of this sheet

**WOULD OTHERS IN YOUR PLANT also like to receive
CHEMICAL PROCESSING without charge?**

If others in your plant also would like to receive CHEMICAL PROCESSING . . . and if they qualify as outlined on the reverse side of this sheet . . . list their names below. Then mail this slip to READER SERVICE DEPT., CHEMICAL PROCESSING, 111 East Delaware Place, Chicago 11, Illinois.

Please print or type

Name Title

Name Title

Name Title

Name Title

Company

Main Products

Rating of Company

Street Address of Company

City Zone No. State

IF YOU ALSO WOULD LIKE

**to receive CHEMICAL PROCESSING personally
see reverse side of this sheet. There is no charge if you qualify.**

See other side of this sheet



THAT'S INTERESTING

domen. Mold, after being sealed at bottom, is filled with a special material which has same density to hard radiation as does human tissue.

"Phantom patient" then receives a trial treatment. Radiation dosage to various sites in model is measured directly by strategically placed ionization chambers.

Maybe day of googol isn't so far away

A billion dollars — a term used not so many years ago with awe — now is as commonplace as "penny."

At the current rate of federal spending, "trillion" bids fair to become as popular a word as "billion." How come?

In the 166 years from the time George Washington first was inaugurated in 1789 through the spring of 1955, the United States spent one trillion (1 followed by 12 zeros) dollars, reports *Ethyl News*.

But if the current rate of spending continues, the cumulative total will pass \$2 trillion in about 11 years. That's using up in 14 years what it previously had taken the country 166 years to spend.

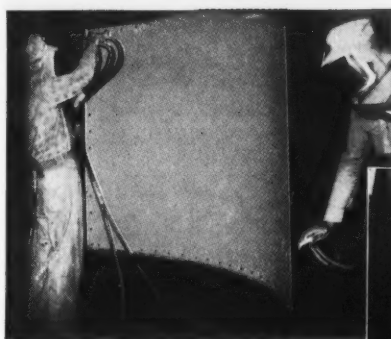
So the day of the googol (1 followed by 100 zeros) might not be too far away!

Snoopers, beware!

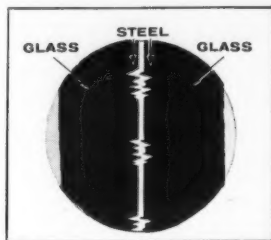
Burglars haven't much chance to avoid detection if someone has them in their Snooper-scope sights.

Device permits after-dark surveillance where it is necessary to see without being seen, making it tough for prowlers and thieves to ply their trades.

Operating on two standard flashlight batteries, Snooper-scope has built-in power source that converts 3 v to 4000 v. Image tube converts invisible infrared light to visible light, with range depending on infrared light source used.



Spraying liquid glass slip on grit-blasted sheets.

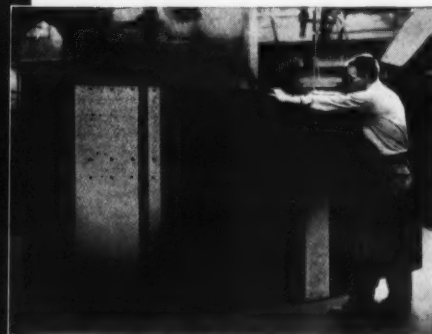


Microphoto shows how glass permanently fuses to steel. (Magnification: 150 diameters.)

this wedding of glass to steel...



Glass is fused to the steel at temperatures in excess of 1,600° F.



Inspection of the finished sheet.

... guards your bulk materials with permanence of steel—purity of glass*

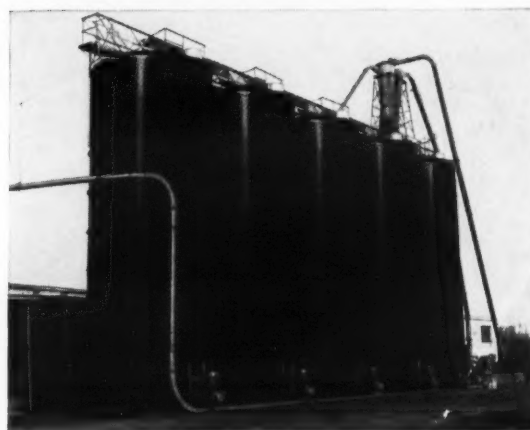
The permanent bonding of glass fused-to-steel inside and out —exclusive with Permaglas MECHANIZED STORAGE UNITS!

Think of it! A clean, gleaming coat of glass... permanently bonded to steel at temperatures in excess of 1,600° F., with bond strength up to 20,000 psi. This impervious glass has the same coefficient of expansion as steel itself... withstands weathering and abrading of bulk materials.

This exclusive feature of Permaglas Mechanized Storage Units makes possible sanitary, easy-to-clean bulk materials handling systems. Eliminates ravages of corrosion... deterioration of stored materials. Virtually ends maintenance costs! Another exclusive feature: Sweep-arm bottom unloaders completely mechanize bulk materials handling... cut labor costs as much as 67%.

Mail coupon today for full details on this new cost-saving way to process and store bulk materials.

*HYDRASTEEL—Process covered by U.S. Patent No. 2,754,222



Exclusive mechanical sweep-arm bottom unloaders, automatically discharge bulk materials into the conveying system in the Permaglas Storage Unit System shown above. Incoming bulk materials are top-loaded directly into the Permaglas Units.

Through research  ... a better way

A.O. Smith
CORPORATION

HARVESTORE PRODUCTS

KANKAKEE, ILLINOIS

A. O. Smith International S.A., Milwaukee 1, Wis.

A. O. SMITH CORPORATION, Dept. CP-109
Kankakee, Illinois

Please have Permaglas System Planning Service Representative call for appointment. Send me free Permaglas Mechanized Storage Unit Bulletin MU-100.

Name.....
Title.....
Company.....
Address.....
City.....Zone...State.....



from the makers of Dimetecote...

ZINKOTE®

**THE FIRST 100% INORGANIC
SELF-CURING ZINC COATING.**



- ✓ A radically new concept in zinc coatings for protecting steel.
- ✓ Under development for many years and first patented in 1957.
- ✓ Applied in one coat — completely self-curing.
- ✓ Can be used wherever galvanizing is satisfactory — actually gives superior protection.
- ✓ Completely nonflammable, nontoxic.
- ✓ Insoluble in all petroleum products.
- ✓ Outstanding resistance to weathering, salt and fresh water.
- ✓ Applied by brush, spray or roller.
- ✓ Cathodically protects steel.
- ✓ Resists temperatures up to 600°F.
- ✓ Complete protection for as little as 5¢ per square foot material cost.

For complete information write...

How does Zinkote compare with Dimetecote?
Although similar, each has certain unique advantages depending upon the particular requirements of the job. We will be glad to give you a specific recommendation.



Dept. PJ • 4809 Firestone Boulevard • South Gate, California
921 Pitner Ave. 360 Carnegie Ave. 2404 Dennis St. 6530 Supply Row
Evanston, Ill. Kenilworth, N.J. Jacksonville, Fla. Houston, Texas

The Pioneer Manufacturer of Inorganic Zinc Coatings

Check 1606 opposite last page.

AMERCOAT PRODUCTS & SERVICES ARE AVAILABLE IN ALL MAJOR CITIES. IN EVERY SECTION OF THE UNITED STATES AND CANADA, AND MANY COUNTRIES IN EUROPE AND SOUTH AMERICA:

UNITED STATES:

ALABAMA	Mobile
ARIZONA	Phoenix
CALIFORNIA	Los Angeles Oakland Fresno
COLORADO	Denver
CONNECTICUT	Waterbury
FLORIDA	Jacksonville
INDIANA	Indianapolis
ILLINOIS	Chicago
IOWA	Des Moines Davenport
KENTUCKY	Louisville
LOUISIANA	New Orleans
MARYLAND	Baltimore
MASSACHUSETTS	Boston
MICHIGAN	Detroit
MINNESOTA	St. Paul
MISSOURI	St. Louis Kansas City
NEW JERSEY	Kenilworth
NEW YORK	New York
OHIO	Cincinnati Cleveland
OKLAHOMA	Tulsa
OREGON	Portland
PENNSYLVANIA	Philadelphia Pittsburgh
TENNESSEE	Memphis Knoxville Nashville
TEXAS	Dallas Houston Beaumont
UTAH	Salt Lake City
WASHINGTON	Seattle
WISCONSIN	Milwaukee Green Bay
HAWAII	Honolulu
PUERTO RICO	Santurce

FOREIGN:

BELGIUM	Brussels
CANADA	Montreal Vancouver
CUBA	Havana
DENMARK	Copenhagen
FINLAND	Helsinki
FRANCE	Paris
GREECE	Athens
HOLLAND	Eindhoven
ITALY	Palermo Milan
JAPAN	Yokohama
LUXEMBOURG	
SWEDEN	Stockholm
SWITZERLAND	Geneva Zurich
UNION OF SOUTH AFRICA	Johannesburg
VENEZUELA	Caracas Maracaibo
WEST GERMANY	Hamburg

12/22/2010

100

595

XUN